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DENTAL REVIEW:

1861.

VOLUME THE THIRD.

London:
JOHN W. DAVIES, 54 PRINCES STREET, LEICESTER SQUARE.
DINBURGH : MACLACHLAN & STEWART. DUBLIN : FANNIN & CO.
PHILADELPHIA : LINDSAY & BLAKISTON.

1861.

M'GOWAN AND DANKS,
16 GREAT WINDMILL STREET,
HAYMARKET.

CONTENTS OF VOLUME THE THIRD.

THE NATURAL HISTORY OF THE HUMAN TEETH: Explaining their Structure, Use, Formation, Growth, and Diseases. By John Hunter, F.R.S. Edited by Francis C. Webb, M.D., F.L.S., F.S.A., Member of the Royal College of Physicians of London; Physician to the Great Northern Hospital, pages 1, 47, 95, 191, 239, 335, 383, 483, 531.

ORIGINAL COMMUNICATIONS.

PAGE

Calcification of the Dental Pulp. By R. T. Hulme, M.R.C.S., F.L.S. (*With Illustrations*) . . 12, 58

Dental Empiricism, Past and Present. By Felix Weiss, M.C.D.E. . . 15

On the Application of Hardened India-rubber to the Manufacture of Artificial Teeth. By Felix Weiss, M.C.D.E. (*With Illustrations*) . . 101, 143

On the Scope, Tendency, and Educational Value of the Natural History Sciences. By T. Spencer Cobbold, M.D., F.L.S. (*With Illustrations*) 107, 152

Lectures on Diseases of the Dental Periosteum. By R. T. Hulme, M.R.C.S., F.L.S. 201, 253, 287, 396, 537

Defective Palates. By George Williams, M.C.D.E. 207, 294

On Sympathetic Nervous Affections connected with the Teeth. By H. T. Kempton, M.C.D. Eng., F.L.S. 247, 300

PAGE

A Course of Three Lectures on the Salivary Glands and Saliva. By B. W. Richardson, M.A., M.D. Lectures I and II 342, 347, 402

On the Reddening of Teeth. By Dr Med. Leopold, Practical Dentist in Stuttgart. Translated by George Henry, M.C.D.E. 392

Croupy Inflammation in the Margin of the Gums, and its Effects. By Dr Steinberger (Vienna). Translated by George Henry, M.C.D.E. . . . 435

On a Case in which the Fully-developed Crown of a Milk-Tooth receded into the Jaw. Observed by Hr Humm, Practical Dentist at Altona in Holstein. Translated by George Henry, M.C.D.E. 490

On the Action of the Deciduous Teeth upon those of the Permanent Set. By Firman Coar, D.D.S. . . . 534

EDITORIAL ARTICLES.

PAGE
Address 20
The South Hants Infirmary and Appointment of Dentist . . 68, 117
Journal of Dental Science . . 70, 161
The Advertising Question . 115, 409, 438
Dental Appointments . . 158, 310
The Metropolitan School of Dental Science 212
The College of Dentists 263
The Lancet and the College of Dentists 308, 352, 412
The New Session (1861) . . 440, 492
National Dental Hospital . . . 496
Progress of the College of Dentists . 543

SELECTED ARTICLES.

Treatise upon the Genesis and Development of the Dental Follicles to the Epoch of the Eruption of the Teeth. By Drs C. H. Robin and E. Magitot 22, 72, 123, 219, 259, 277, 359, 454, 506
Tobacco—Its Effects upon the General Health, and its Influence upon the Teeth 27, 75
Dentition and its Derangements. By A. Jacobi, M.D., Professor of Infantile Pathology and Therapeutics 118, 163, 214, 311, 447, 497, 546
Hippopotamus Teeth or Tusks. By Thomas D. Rock 223
On Dental Pharmacy. By Ed. Parrish 356
Alveolar Abscess. By Dr J. E. Garretson 516

PROCEEDINGS OF DENTAL SOCIETIES.

College of Dentists of England 33, 77, 127, 169, 229, 282, 319, 376, 431, 465, 520, 558
Odontological Society of London . 37, 84, 129, 172, 283, 560
Metropolitan School of Dental Science 86, 231, 432, 465, 523
Society of German Dentists . 87, 373, 460
Complimentary Dinner to President of College of Dentists . . . 463
Pennsylvania Association of Dental Surgeons 130
American Colleges 174
National Dental Hospital . . 320, 563
American Dental Convention . . 414

REVIEWS AND NOTICES OF BOOKS.

Observations on Stopping Teeth. By S. Longhurst 40
The Dentists' Handy Book . . . 40
Elements of Medical Zoology. By A. Moquin - Tandon. Translated and edited by R. T. Hulme 267
A Manual of the Practice of Medicine. By Thos. H. Tanner . . . 441

CORRESPONDENCE.

PAGE
Dr Richardson's Lectures on Anæsthesia—Letters from Mr Jacob . . 41, 90
The Attacks on the College of Dentists—Letters from a Member . 90, 135
Dental Empiricism—Letter from Mr Ward 133
Journalistic Abuse—
Letter from a Ci-devant Workman . 136
" " M.C.D.E. 189
" " Dens Provincialis . . 567
Correspondence between the Secretary of the College of Dentists and the Editor of the 'Journal of Dental Science' 186
Professor Owen's Edition of Hunter's Essays on Natural History—Letter from a Constant Reader . . . 188
Explosion of Teeth—Letter from Mr Jacob 285
The 'Lancet' and the College of Dentists—Letters of Mr Waite . 331, 376
Mendacity of the 'Journal of Dental Science—Letter from Mr Wayling . 432
Professional Advertisements—
Letter from a Member of the College of Dentists . . 472
" " Dr Purland . . . 473
" " a Dentist . . . 475
" " a Country Practitioner . 478
Chemists holding the Dental Certificate of the College of Surgeons—Letter from a Sincere Wellwisher to the Profession 474
Appointment of Dentist to Fort Pitt, Chatham—Letter from Mr J. Cox Smith 525
Impression Trays—Letter from Mr Weiss 528

MISCELLANEOUS.

Atrasia Oris—Cementation of Iron—Arrest of Development in the Inferior Maxillary Bone—Staphyloraphy—Toothpicks—Poisoning of Thenard by Corrosive Sublimate—Neuralgia with Deafness—Something New about Gold . . . . . . 42—45
South Hants Infirmary—Illiberal Interference—Chloroform Liniment for Dental Purposes—Remedy for Bad Breath—Fang-filling—Morrison *v.* Churchill . . . . . 93—94
Appointment—Royal South Hants Infirmary—Lows *v.* Kedwick: Injunction—Lord Oxygen—Chemical and Physiological Studies on Bones 139—142
Metropolitan School of Dental Science—Appointments—Revue Odontotechnique—Nitric Acid Stains—Shipment of Gas 189
How Hunter worked 237
National Dental Hospital—Dental Colleges—Chloroform in Dentistry 285—286
Termination of Motor Nerves—Vegetable Wax 334
Dental Appointment—Cyanide of Potassium in Soldering Metals—Sacrificial Metals—Liabilities to Dentists 380—382
Royal College of Surgeons—Dental Appointment—South Hants Infirmary—Death of Professor Quekett, F.R.S.—Explosion among the Vulcanizers . . . . . 433—434
Dentistry in Corfu and the Ionian Islands—The Scottish Vulcanite Company's Works 480
Dental Hospital—Chloroform in Dentistry 528
Dental Appointment—Important Hull Dentist Case—Furred Tongue on one side caused by a Decayed Tooth on the same side—Furred Tongue on one side; Second Molar Tooth of Upper Jaw Diseased—Diseased Molar Tooth of the Lower Jaw producing Excoriation of the Auditory Canal on the same side, and an Enlarged Lymphatic Gland, cured by Removal of the Tooth—Dentistry in Turkey . 568—570

QUARTERLY DENTAL RETROSPECT, 1861.

	PAGE		PAGE
January to April	175	July to October	465
April to July	323		

Notices to Readers and Correspondents: —46, 94, 142, 190, 238, 286, 334, 383, 434, 482, 530, 567.

W. Geo Beers
Montreal

THE DENTAL REVIEW.

JANUARY, 1861.

THE NATURAL HISTORY OF THE HUMAN TEETH: EXPLAINING THEIR STRUCTURE, USE, FORMATION, GROWTH, AND DISEASES.

By JOHN HUNTER,
Surgeon Extraordinary to the King, and Fellow of the Royal Society.

EDITED BY
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Member of the Royal College of Physicians of London; Physician to the Great Northern Hospital, and to the Margaret Street Infirmary for Consumption and Diseases of the Chest; Lecturer on Forensic Medicine at the Grosvenor Place School, &c.

In undertaking the task of editing for the pages of the Dental Review a reprint of John Hunter's classical work on the Natural History and Diseases of the Human Teeth, it has been my object primarily to present the reader with a carefully-collated edition of the original Treatise, and secondly to append, in the form of notes, an abridgment of the information which has been accumulated by later Authors of repute on the Anatomy, Physiology, and Pathology of the Teeth.

I have ventured also to add some few annotations in illustration of the text. Many of these will be found derived from the department of Comparative Anatomy. No apology is, I think, needed for their introduction. They have been principally furnished from the rich mine contained in the writings of the distinguished English naturalist on whom, it may be truly said, the mantle of Hunter has fallen, to whose genius and diligence the scientific world is indebted for the Catalogue of the Hunterian Museum, as well as for the most original and complete Treatise on Teeth extant.*

The Author's original notes (exclusive of the references to plates) are retained in the present edition, and are differenced from those of the Editor by the usual marks of reference, the letters of the alphabet being employed to distinguish the latter, which are also printed within brackets. Use has likewise been made of the labours of a former Editor, Mr Thomas Bell, F.R.S. That gentleman's annotations are acknowledged and distinguished by the annexion of his name.

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* Odontography; or, A Treatise on the Comparative Anatomy of the Teeth. By Professor Owen, F.R.S.

It will be found that that portion of the work which relates to the treatment of Diseases and Deformities of the Teeth has been allowed to appear with but little comment. It need scarcely be observed that, in the present day, a Physician is but slenderly qualified to offer information on points of special practice to the Professors of Dentistry—an art which, since the time of Hunter, has been so successfully cultivated as a distinct Profession. F. C. W.

OF THE UPPER-JAW.

Before we enter into a description of the Teeth themselves, it will be necessary to give an account of the Upper and Lower Jaw-bones, in which they are inserted; insisting minutely on those parts which are connected with the Teeth, or serve for their motion and action, and passing over the others slightly.

The Upper-Jaw is composed of two bones,(*a*) which generally

(*a*) [The superior maxillary bones (*maxillæ superiores*). In addition, it may be stated that the palatine bone on each side is generally reckoned as constituting part of the upper jaw, although in the cavity of the mouth it is confined to the palate, and forms no portion of the alveolar process. In the class Mammalia, the upper jaw consists of three bones on each side,—the palatine, superior maxillary, and inter- or premaxillary bones. The last-named bones constitute the anterior portion of the jaw, and form the alveoli of the superior incisors. Whatever modification in size or shape the teeth implanted in the premaxillary bones may display, they are, nevertheless, classed as incisors in the dental formulæ of naturalists. Anchylosis between the superior and premaxillaries takes place sooner or later in life in the typical Quadrumana. In the Chimpanzee, the facial portion of the maxillo-intermaxillary suture disappears at or about the period of the first dentition; in the Orangs, the suture remains until the development of the great canine teeth; in the Semnopitheci and Inui, the separation continues distinct until the period of old age. In Man, on the contrary, the process of anchylosis (with the exception of a portion of the suture on the palate, which usually remains until after birth) is completed before the termination of intra-uterine existence. It is, therefore, only in the fœtal condition that Man can be said to possess an intermaxillary bone; and even this has been denied by many writers, on the ground that the fissure of separation cannot be remain distinct through life.(*b*) They are very irregular at their posterior and upper parts, sending upwards and backwards a great many processes, that are connected with the bones of the Face and Skull. The lower and anterior parts of the Upper-Jaw are more uniform, making a kind of a circular sweep from side to side, the convexity of which is turned forwards; the lower part terminates in a thick edge, full of sockets for the Teeth. This edge is called in each bone the Alveolar Process. Behind the Alveolar Processes there are two horizontal lamellæ, which uniting together, form part of the roof of the Mouth, which is the partition between the Mouth and the Nose.

This plate, or partition, is situated about half an inch higher

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traced through the external alveolar plate. On the other hand, analogy, the constant existence of the nasal and palatal portions of the maxillo-intermaxillary fissure in intra-uterine life, and the entire separation of the incisive portion of the superior maxillary bone in certain cases of deformity (double hare-lip), are strong arguments for admitting the premaxillary as an original element of the human skull. Direct observation appears, however, to have definitively settled the question. Some years since Dr Leidy announced to the Academy of Natural Sciences of Philadelphia (1) that he had found the inter-maxillary entirely separable in an embryo of one inch eleven lines in length. The division in this case was traceable through the alveolar ridge at a point corresponding to the separation between the incisor and canine alveoli. A figure of the preparation is published in the Proceedings of the Academy. The more recent researches (2) of Robin and Magitot strongly confirm Dr Leidy's observation. These observers have discovered the existence of a separate formative cartilage for each premaxillary, in which an osseous point is developed two or three days after the first deposition of ossific matter in the alveolar edge of the formative cartilage of the superior maxillary.

It is stated by Sœmmerring, that vestiges of the maxillo-intermaxillary suture are to be noticed in Negro crania. Dr Prichard long since denied any constancy of difference between the melanous and leucous varieties in this respect, and extended observation will verify his statement. In skulls of all nations, it is not very uncommon to find some small vestige of the suture both on the palate and in the floor of the nares, extending outwards from the anterior palatine canal; more rarely it may be traced on the palate to within a short distance of the alveolus. An instance of the permanency of any portion of the suture on the face has never fallen under the Editor's notice.]

(*b*) [Anchylosis between the superior maxillary bones is exceptional in Man. Obliteration of the facial portion of the mesian premaxillary suture commonly takes place as life advances in the Anthropoid Apes.]

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(1) Proceed. Acad. Nat. Sciences, Philadelphia, Jan., 1849, p. 145.
(2) *Vide* Dental Cosmos, August, 1860, p. 5.

than the lower edge of the Alveolar Process; and this gives the roof of the Mouth a considerable hollowness.(*c*)

The use of the Upper-Jaw is to form part of the Parietes of the Mouth, Nose, and Orbits; to give a basis, or supply the Alveolar Process, for the superior row of Teeth, and to counteract the Lower-Jaw; but it has no motion itself upon the bones of the Head and Face.(*d*)

OF THE LOWER-JAW.

As the Lower-Jaw is extremely moveable, and its motion is indispensably necessary in all the various operations of the Teeth, it requires to be more particularly described. It is much more simple in its form than the Upper, having fewer processes, and these not so irregular. Its anterior circular part is placed directly under that of the Upper-Jaw; but its other parts extend farther backwards.

This Jaw is at first composed of two distinct bones; (*e*) but

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(*c*) [The hollowness and breadth of the palate vary in individual crania. It will be also found of greater comparative length in prognathic skulls. In the larger number of Australian crania, and in those of other dark-skinned races which approach the Australo-Tasmanian type, the bony palate is relatively of great breadth and length.]

(*d*) [The fixity of the bones constituting the upper jaw is a character common to Mammalia, and contrasts with the moveable condition of the upper mandible in birds—the distensibility resulting from the elastic ligamentous connection which subsists between the premaxillary and maxillary bones in the constricting serpents—the moveable articulation of the superior maxillary in the poisonous serpents—and with the loose connection of the corresponding bones in fishes, which permits, in addition to the ordinary movements, those of protrusion and retraction.]

(*e*) [The ossification of the lower jaw, from two ossific centres, each of which forms a lateral half, is one of the few osteological characters which Professor Owen enumerates as being common and peculiar to the Mammalia. (1) In the human subject, authorities are at variance as to the ossification of the inferior maxilla. Kerckringius describes a separate ossific centre for the coronoid process; and he is confirmed by Autenrieth, Spix, and Béclard. Autenrieth enumerates two other separate points of ossification—one in the condyle, the other in the angle. Another, forming the inner border of the alveolus, is described and figured by Spix, who also admits those mentioned by Autenrieth. Cruveilhier allows the separate ossification of the internal alveolar plate, but denies the existence of other secondary nuclei. On the other hand, J. F. Meckel and Nesbitt maintain the ossification of each lateral half from a single centre. The former anatomist attributes the appearance of the separation of the internal alveolar plate to the depth of the groove or these, soon after birth, unite into one, at the middle of the chin. (*f*) This union is called the Symphysis of the Jaw. Upon the upper edge of the body of the bone is placed the Alveolar Process, a good deal similar to that of the Upper-Jaw. The Alveolar Process extends all round the upper part of the bone, from the Coronoide Process of one side, to that of the other. (*g*) In both Jaws they are every where relatively proportional to the Teeth; being thicker behind, where the Teeth are larger, (*h*) and more irregular, upon account of the more numerous fangs in-

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(1) On the Classification and Geographical Distribution of the Mammalia, p. 13.

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fissure for the mylo-hyoid nerve. One reason for the discrepancy which prevails with regard to the ossification of the mandible, is the rapidity with which the process is carried on, and the early period at which it commences. Bony deposit is found in the inferior maxillary earlier than in any other bone except the clavicle. (1)]

(*f*) [Union of the lateral halves takes place during the first year after birth, but a trace of separation may be found at the upper part in the beginning of the second year. (2)]

(*g*) [Unbroken continuity of the alveolar series in both jaws is amongst existing Mammalia only to be found constantly in Man. In the highest genus of the Quadrumana (*Troglodytes*), there is a considerable *diastema* or interspace between the canine and lateral incisor in the upper jaw, and usually a smaller interval is present between the canine and anterior premolar in the lower. In the larger species of Orang (*Pithecus Satyrus*), a corresponding wide interval exists between the upper canine and the contiguous incisor; in the lower jaw the occurrence of a *diastema* is not constant. In one specimen of the smaller species of Orang (*Pith. Morio*), described by Professor Owen, the upper jaw exhibited the ordinary *diastema;* but in a second specimen it was absent, and the teeth were as uninterrupted as in the human subject. In both specimens, the implantation of the teeth in the lower jaw was continuous. In *Pithecus Morio*, the occasional absence of interval in the alveolar series would appear to depend on the large size of the teeth, which equal those of the Great Orang and the small relative proportions of the maxillæ. In Man, the constant continuity of the alveolar series is evidently associated with the equable length of the teeth, the shortness of the jaws, and the small size of the cuspidati. In the Great Apes, when the mouth is closed, the long crown of the laniary is lodged in the corresponding interspace between the teeth of the opposed jaw. The value, however, of this as a peculiar characteristic of Man is diminished by the discovery of a similar unbroken proximity of the teeth in some extinct Quadrupeds; *e.g.*, Anoplotherium, Nesodon, Dichodon. (3)]

(*h*) [The alveoli in Man increase regularly in size from the incisors to the true molars. In the Anthropoid Apes, the largest socket is that for the great canine tooth.]

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(1) Quain's Anat., 6th edition, vol. i., p. 78.
(2) Op. cit., p. 78.
(3) Owen, Transactions of the Zool. Soc.; Art. "Teeth," Todd's Cyclopædia of Anatomy; Quarterly Journal of the Geol. Soc., February 1848.

serted into them.(*i*) The Teeth that are situated backwards, in the Upper-Jaw, have more fangs than those that correspond with them in the lower, and the sockets are accordingly more irregular. The Alveolar Process of the Upper-Jaw, is a section of a larger circle than that of the lower, especially when the Teeth are in the sockets. This arises chiefly from the anterior Teeth in the Upper-Jaw being broader and flatter than those in the Lower. The posterior part of the bone on each side rises almost perpendicularly, and terminates above in two processes; the anterior of which is the highest, is thin and pointed, and is called the Coronoide Process. The anterior edge of this process forms a ridge, which goes obliquely downward and forward on the Jaw, upon the outside of the posterior sockets. To this process the Temporal Muscle is attached; and as it rises above the center of motion, that Muscle acts with nearly equal advantage in all the different situations of the Jaw.

The Posterior Process, which is made for a moveable articulation with the head, runs upward, and a little backward; is narrower, thicker, and shorter, than the anterior; and terminates in an oblong rounded head,(*j*) or Condyle, whose longest axis is nearly transverse. The Condyle is bended a little forward; is rounded, or convex, from the fore to the back part; and likewise a little rounded from one end to the other, or from right to left.(*k*) Its external end is turned a little forward, and its internal a little backward; so that the axis of the two Condyles are neither in the same straight line, nor parallel to each

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(*i*) [In the greater number of skulls of the Australo-Tasmanian variety of Man, and in some skulls of African Negroes, especially of those inhabiting the Western Coast, the alveoli of the grinding series will be found of great relative breadth. This thickness of the molar alveoli in these races is dependent on the large size and complex implantation of the corresponding teeth.]

(*j*) [In all animals which suckle their young, the condyle is convex or flat, never concave. In birds and reptiles, the articular surface is concave. These characters are of the greatest value to the palæontologist in the determination of fossil remains.]

(*k*) [The regularly oval shape of the articulating condyle in the human mandible contrasts with the configuration of the same process in the highest known Ape (*Troglodytes Gorilla*). In the Gorilla, the inner end of the articulating condyle is the larger, and the posterior border of the articulating surface wants that abrupt definition which is observed in Man. In this latter respect the Chimpanzee (*Trog. niger*) makes a nearer approach to the human conformation. (1)]

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(1) Owen on the Osteology of the Chimpanzees and Orangs, Zool. Trans., vol. iv., p. 89.

other; but the axis of each Condyle, if continued backwards, would meet, and form an angle of about one hundred and forty-six degrees; and lines drawn from the Symphysis of the Chin, to the middle of the Condyle, would intersect their longest axis, at nearly right angles. There are, however, some exceptions; for in a Lower-Jaw, of which I have a drawing, the angle formed by the supposed continuation of the two axes, instead of being an angle of one hundred and forty-six degrees, is of one hundred and ten only. The Lower-Jaw serves for a base to support the Teeth in the Alveolar Process, during their action on those of the Upper-Jaw in mastication; and to give origin to some muscles that belong to other parts.

OF THE ALVEOLAR PROCESSES.

The Alveolar Processes are composed of two thin bony plates, one external, and the other internal. These two plates are at a greater distance from each other at their posterior ends, than at the anterior, or middle part of the Jaw. They are united together by thin bony partitions going a cross, which divide the processes at the anterior part, into just as many distinct sockets as there are Teeth; but at the posterior part, where the Teeth have more than one root or fang, there are distinct cells, or sockets, for every root. These transverse partitions are more protuberant than the Alveolar Plates; and thus add laterally to the depth of the Cells, particularly at the anterior part of the Jaw. At each partition, the external plate of the Alveolar Process is depressed, and forming furrows, or a fluting rounds the cells, or cavities, for the roots of the Teeth. This is observable in the whole length of the Alveolar Process of the Upper-Jaw; and in the fore-part particularly of the Lower-Jaw. The Alveolar Processes of each Jaw, form about one half of a circular, or rather of an elliptical figure;(*l*) and at the fore-part

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(*l*) [The elliptical figure described by the alveolar borders of both jaws, and the regularly convex horse-shoe shape of the lower jaw, strongly characterize the human as opposed to quadrumanous configuration. In Man, the molar series, including the premolars, describes a well-marked curve with the convexity outwards. In the Anthropoid Apes, the teeth from the last molar to the canine are arranged almost in a straight line, with a very slight inflection inwards. They are parallel on the two sides, and are joined at right angles by the line of the incisive alveoli, which unites them in front. See plate 1. (1)]

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(1) Op. cit.

in the Lower-Jaw they are perpendicular,(*m*) but project inwards at the posterior part, and describe a smaller circle than the body of the bone upon which they stand; as we shall observe more particularly hereafter, when we come to treat of the Jaws of Old People.

The Alveolar Processes of both Jaws should rather be considered as belonging to the Teeth, than as parts of the Jaws; for they begin to be formed with the Teeth, keep pace with them in their growth, and decay, and intirely disappear, when the Teeth fall; so that, if we had no Teeth, it is likely we should not only have no sockets, but not even these processes, in which the sockets are formed; and the Jaws can perform their motions, and give origin to muscles, without either the Teeth, or Alveolar Processes. In short, there is such a mutual dependence of the Teeth, and Alveolar Processes on each other, that the destruction of the one seems to be always attended with that of the other.(*n*)

In the head of a young subject which I examined, I found that the two first Incisor Teeth in the Upper-Jaw had not cut the Gum; nor had they any root or fang, excepting so much as was necessary to fasten them to the Gum, on their upper surface; and on examining the Jaw, I found there was no Alveolar Process, nor sockets, in that part. What had been the cause of this, I will not pretend to say: whether it was owing to the Teeth forming not in the Jaw, but in the Gum; or to the wasting of the fangs. The appearance of the Tooth favoured the first supposition; for it was not like those, whose fangs are decayed in young subjects, in order to the shedding of the Teeth; and as it did not cut the Gum, it is reasonable to think it never had any fang. That end from which the fang should have grown, was formed into two round and smooth points, having each a small hole leading into the body of the Tooth, which was pretty well formed.

(*m*) [The direction of the incisor alveoli varies in individuals and in races. In the melanous varieties, it is usual to find the anterior portion of the alveolar border projecting in both jaws, especially in the upper; in the leucous and xanthous varieties, the anterior contour of the incisor alveoli is more usually perpendicular. But individuals occur in every variety in whom a greater or less degree of the prognathic configuration is discernible.]

(*n*) This observation is strictly correct: however rapidly the gum becomes absorbed, whether from indigestion, the use of mercury, the accumulation of calcareous matter, or that affection which is vulgarly termed scurvy in the gum, the alveolar process never becomes exposed (unless it be a dead portion exfoliating), but absorption of the bone always keeps pace with that of the gum.—T. Bell.

OF THE ARTICULATION OF THE LOWER-JAW.

Just under the beginning of the Zygomatic Process of each Temporal Bone, before the external Meatus Auditorius, an oblong cavity (*o*) may be observed; in direction, length, and breadth, in some measure corresponding with the Condyle of the Lower-Jaw. (*p*) Before, and adjoining to this cavity, there is an oblong eminence, (*q*) placed in the same direction, convex upon the top, in the direction of its shorter axis, which runs from behind forwards; and a little concave in the direction of its longer axis, which runs from within outwards. It is a little broader at its outer extremity; as the outer corresponding end of the Condyle describes a larger circle in its motion than the inner. The

(*o*) [In all Mammals the articular surface for the condyle is either concave or flat.]

(*p*) [It is evident that the description in the text refers only to the articulating portion of the glenoid cavity, or that anterior to the Glaserian fissure. The posterior portion of the cavity lodges a process of the parotid gland, and does not enter into the articulation. In Man, as in all other Mammalia, the lower jaw articulates with the squamous element of the temporal bone; in them the tympanic element is restricted to a subserviency to the organ of hearing. But this is not the case in the other vertebrate classes. In birds, reptiles, and osseous fishes, the mandible articulates with a bone, which is the homologue of the tympanic ring in Man. In cartilaginous fishes, the articulating surface is formed by the pterygoid bone, the homologue of the internal pterygoid plate in the human subject. In the Lepidosiren, which in other respects presents a curious amalgamation of the characters of the osseous and cartilaginous fishes, the pterygoid bone contributes the inner, the tympanic the outer portion of the recipient articular surface. (1)

The articulating portion of the glenoid cavity is bounded posteriorly in the Anthropoid Apes, and generally in the lower Mammalia, by a prominent ridge or process. In the Rodentia, the same ridge bounds the articulating cavity internally. In Man this posterior boundary is absent, or but slightly indicated. The downward development of the human cranium posterior to the articulating surface, affording, as it does, a support against backward dislocation, obviates the necessity for the development of a post-glenoid process. (2) When its rudiment exists in Man, it is known as the middle root of the zygoma. I believe that the Author of the article Temporo-Maxillary Articulation is mistaken when he asserts that this process is more frequently indicated in the lower races of mankind. I have seen it at least as frequently in the skulls of the natives of Europe and Asia as in African and Australian crania.]

(*q*) [Anterior root of the zygoma.]

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(1) Owen. *Vide* article Temporo-Maxillary Articulation, in Todd's Cyclopædia of Anatomy, by S. R. Pittard.

(2) Owen, Zool. Trans., vol. i., p. 346.

surface of the cavity, and eminence, is covered with one continued smooth cartilaginous crust,(*r*) which is somewhat ligamentous, for by putrefaction it peels off, like a membrane, with the common Periosteum. Both the cavity and eminence serve for the motion of the Condyle of the Lower-Jaw. The surface of the cavity is directed downward; that of the eminence downward and backward, in such a manner that a transverse section of both would represent the Italick letter *S*. Though the eminence may, on a first view of it, appear to project considerably below the cavity, yet a line drawn from the bottom of the cavity, to the most depending part of the eminence, is almost horizontal, and therefore nearly parallel with the line made by the grinding surfaces of the Teeth in the Upper-Jaw: and when we consider the Articulation farther, we shall find that these two lines are so nearly parallel, that the Condyle moves almost directly forwards, in passing from the cavity to the eminence; and the parallelism of the motion is also preserved by the shape of an intermediate cartilage.

In this joint there is a moveable cartilage,(*s*) which, though common to both Condyle and cavity, ought to be considered rather as an appendage of the former than of the latter, being more closely connected with it; so as to accompany it in its motion along the common surface of both the cavity and eminence. This cartilage is nearly of the same dimensions with the Condyle, which it covers; is hollowed on its inferior surface, to receive the Condyle: (*t*) on its upper surface it is more unequal, being moulded to the cavity and eminence of the articulating surface of the Temporal Bone, though it is considerably less, and is therefore capable of being moved with the Condyle, from one part of that surface to another. Its texture is ligamento-cartilagineous. This moveable cartilage is connected with both the Condyle of the Jaw, and the articulating surface of the Temporal Bone, by distinct ligaments, arising

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(*r*) [It is only that portion of the glenoid cavity concerned in the articulation of the joint which is covered with cartilage.]

(*s*) [The inter-articular fibro-cartilage. It is the only inter-articular fibro-cartilage into which muscular fibres are inserted—viz., a portion of the external pterygoid, which it receives along its anterior border, and which is instrumental in moving the fibro-cartilage in the antero-posterior motion of the condyle. The inter-articular fibro-cartilage is constantly found in animals which suckle their young, but not in the inferior vertebrata.]

(*t*) [The inter-articular fibro-cartilage is thicker at the edges than in the centre; it is not unfrequently perforated in the latter situation.]

from its edges all round.(*u*) That by which it is attached to the Temporal Bone, is the most free and loose; though both ligaments will allow an easy motion, or sliding of the cartilage on the respective surfaces of the Condyle, and Temporal Bone. These attachments of the cartilage are strengthened, and the whole articulation secured, by an external ligament, which is common to both, and which is fixed to the Temporal Bone, and to the neck of the Condyle. On the inner surface of the ligament, which attaches the cartilage to the Temporal Bone, and backwards, in the cavity, is placed what is commonly called the Gland of the Joint; at least, the ligament is there much more vascular than at any other part.(*v*)

(To be continued.)

(*u*) [*Membranæ articulares* (Weitbrecht).—Thin and short ligamentous fibres which cover the synovial membranes, and serve to connect the fibro-cartilage with the osseous margins. These thin ligamentous structures are not distinguished in the text from the synovial bursæ, neither is it usual to find the latter noticed specially in anatomical works of the period. They had been, however, described at some length by Weitbrecht, whose work appeared in 1742. (1) They are two in number—one placed above the fibro-cartilage, the other below it. The superior is the larger and looser; it lines the upper surface of the inter-articular cartilage and the smooth part of the glenoid cavity. The inferior is interposed between the condyle and the lower surface of the fibro-cartilage. When the latter structure is perforated in the centre, the synovial bursæ communicate and form one cavity.]

(*v*) [Dr Clopton Havers, (2) in 1691, described the vascular processes of the synovial membrane, which are commonly found projecting more or less into the cavities of joints. When these processes are of any size, they generally contain fat. They are frequently cleft, so as to present a fringed appearance at their free border, which is very vascular. Dr Havers regarded them as special structures for the secretion of synovia, and named them the "mucilaginous glands of the joints." Subsequent anatomists have generally denied them a special function, although, as extensions of the synovial membrane, they must necessarily increase the amount of secretion. Havers's view was revived by Mr Rainey, in a paper published in the Proceedings of the Royal Society, in 1846. He bases his advocacy on the constant occurrence of such vascular processes, not only in the joints, but also in synovial sheaths, on a peculiar convoluted condition of their blood-vessels, and on the arrangement of the epithelium covering them, which, "besides enclosing separately each packet of convoluted vessels, sends off from each tubular sheath secondary processes of various shapes, into which no blood-vessels enter." Mr Rainey's account of the structure of these processes has since been confirmed in most particulars by Kölliker. (3)]

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(1) Syndesmologia, p. 80, 1742.
(2) Osteologia Nova, p. 187, 1691.
(3) *Vide* Quain's Anat., sixth edit., vol. i., p. ccxlix.

ORIGINAL COMMUNICATIONS.

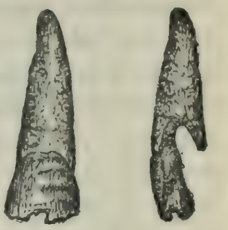
ON CALCIFICATION OF THE DENTAL PULP:

A Paper read at the Monthly Meeting held at the College of Dentists, December 4th, 1860,

By R. T. Hulme, M.R.C.S., F.L.S.

The subject of calcification of the dental pulp, although it has been noticed by several writers, appears to be deserving of still further attention, and to be of more practical importance than it has hitherto been considered. Unlike the other parts of the osseous system, the teeth possess no direct means of resisting or repairing the ravages of disease. It would, however, be contrary to what is met with in every other part of the body, if Nature left these organs without some power of protecting themselves against the injuries and the pathological changes to which they are liable. A soft and more or less fluid condition of the tissues is necessary for carrying on the process of absorption, and for the reproduction of parts which have been lost, either by accident or disease. In most of the organs this is the condition in which they are naturally found; or if, like the bones, they present themselves in a more solid form, then they are surrounded by soft structures, and are freely permeated by a system of capillary blood-vessels, so that they are still capable of undergoing similar changes to those which take place in other parts of the body. The teeth, on the contrary, are only invested by soft structures around their roots, while all that portion which is known as the crown of the tooth is left exposed to the influence of the atmosphere and of the fluids of the mouth. It is true that even on the crown it is possible to demonstrate the presence of a closely-adherent membrane, termed "Nasmyth's persistent membrane;" but this is not of such a nature as to alter the condition of the tooth in a physiological point of view, and if, in the first instance, it serves as a means of protection, it does not, after the invasion of disease, bestow upon the organ any power of reparation, or of reproducing those portions which have been injured or destroyed.

The commonest, and, at the same time, the most fatal disease to which the crown of the tooth is liable, is that which we are all familiar with under the title of caries. Whatever opinions may be entertained as to the nature of this disease, there can be no question that it commences on the external surface of the tooth, and that it gradually makes its way towards the pulp cavity. The crown is also occasionally subject to a peculiar process of destruction, which Hunter designated by the term denudation, and which also commences on the exterior. The working surfaces of the teeth in old persons are often worn away to a considerable extent by mastication. Where the back teeth have been lost, and the person has been compelled, in consequence, to eat entirely with the front teeth, those of the upper jaw become worn away by the action of the lower teeth, sometimes the whole surface being abraded almost level with the gum, while, in other instances, all that is left of the crown consists of the layer of enamel on its labial surface, supported by a thin plate of dentine on the lingual surface. In these cases the original pulp cavity and the surrounding dentine become either entirely or partially removed. Such a case is shown in figure 1, which represents a front and side view of an upper central incisor that has been thus acted upon by the teeth in the opposite jaw, and where the pulp cavity and the dentine have become obliterated nearly to the neck of the tooth. More rarely a similar condition is brought about in some of the lower teeth.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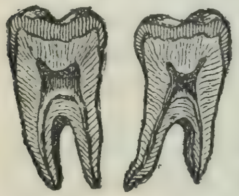
Again, where artificial teeth have been improperly fastened, by means of hard wires or bands, the constant result is the destruction of a considerable portion of the tooth's surface. In some cases the wire will be found to have penetrated fully one-third of the thickness of the dentine on the side of the tooth with which it was in contact. In the case of bands the injury extends over a greater extent of surface, but seldom enters so deeply into the substance of the tooth.

In all these cases the injury occurs on the exterior of the tooth, which, as has been stated, possesses no power of restoration, and hence the part which is once destroyed is never reproduced. Experience, however, teaches us that the effects of these morbid processes and of these injuries differ greatly in different persons. Thus, for instance, in some cases caries runs an exceedingly rapid course; it has scarcely commenced before pain arises, and soon necessitates the extraction of the tooth: in other cases, on the contrary, its course is just as slow, and it may go on until the entire crown of the tooth is destroyed, without ever giving rise to pain of any importance. How, then, is this difference to be accounted for? In order to answer this question, it is necessary to consider what takes place in the interior of the tooth, and to ascertain whether any changes are superinduced in the pulp or in the dentine; and if so, what is the nature of the alterations which these parts undergo.

Much as physiologists differ with regard to the precise method of dentification, yet all are agreed that it takes place through the agency of the pulp, and that, commencing on the apex and external surface of the formative organ, it then proceeds inwards until the tooth acquires its prescribed form and size, and the dentine has attained its normal thickness. When this is accomplished, the formation of the tooth is completed, and the same arrest of growth takes place as occurs in every other part of the body at the adult period of life. If the person enjoys good health, and the tooth remains free from injury or disease, it may continue for some years without any appreciable alteration, in either the osseous tissues which enter into its formation, or in the pulp itself. Sooner or later, however, as years go on, a change takes place in the character of the nutritive process throughout the body. The proportions which the fluids bore to the solids in early or middle life is diminished, nutrition is accomplished more slowly, and the composition of the various tissues undergoes a marked alteration. There is a general induration of the parts, and a tendency to the deposition of ossific matter : ligament is converted into cartilage, cartilage into bone, the coats of the blood-vessels are often impregnated with calcareous matter, and the cartilage of the ribs becomes ossified. If we turn our attention to the teeth, or, more correctly speaking, to their pulps, we shall find that they also are liable to a similar alteration of structure. When a section is made through an old tooth, apart from the changes which may be noticed in the colour and transparency of certain portions of the original dentine, the pulp cavity will be seen to have been greatly encroached upon, and the entire mass of the tooth increased in thickness. The extent to which this filling-up of the pulp cavity can take place is shown in the accompanying drawings. Fig. 2 represents a section of a fully-developed molar in early life, when the tooth has attained its normal amount of growth; whilst figure 3 represents a similar section of a molar tooth taken from an elderly person, and in which the pulp cavity has become diminished to the extent of fully one-half of its original dimensions. This change in the cavity of the tooth can only have taken place through the agency of the pulp, which, after a period of repose, must have returned to its original function of calcification, and have added fresh layers of dentine to the inner surface of the tooth.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"The teeth," says Wedl,* "are distinguished at different ages by a diminution of the pulp cavity, an increase of thickness in the *cementum*, and a lessening of that of the enamel, and of the transparency of the three dental substances ; by the edges and angles becoming blunted, and the surface assuming a yellow tinge, &c. These distinctions are most striking in the teeth of old men. In the *pulp* of teeth in this condition will be noticed a considerable diminution in the quantity of blood, the colour of that tissue often passing into a brownish yellow from the quantity of pigment deposited in it. Earthy salts, assuming the outward form of the botryoidal corpuscles met with in the pineal gland, occur on the inner surface of the pulp cavity and of the dental canal, and also deposited in groups in the substance of the pulp. An increased number of layers of *cementum* will be observed, though these are often concealed by the opaque, brownish yellowish colour of the intercorpuscular substance. In thin sections, the *dentine*, sometimes throughout, sometimes only in isolated spots, appears less transparent than natural, and the dentinal tubes become less distinct, and occasionally disappear altogether in the dark grey or brownish yellow substance. These partial opacities of the dentine are manifested even to the naked eye by a speckled appearance. The enamel presents dark, reddish brown spots, and, as well as the dentine, appears to have lost some of its elasticity, and to have become more brittle."

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* *Rudiments of Pathological Histology*, p. 160 ; Sydenham Society.

(To be continued.)

DENTAL EMPIRICISM, PAST AND PRESENT.

By Felix Weiss, M.C.D.E.

Although it cannot be denied that the Dental Profession has made, of late years, great progress towards its permanent establishment as one of the most useful and honourable institutions of this or any country—(a progress not only in the art itself, but in the general education of its professors)—yet it is melancholy to reflect upon the degradation and selfishness which still attach to several of its members. "Go forward," says the first President of the Cincinnati Dental Association—"Go forward in the good cause, unintimidated by the scepticism of the faithless, the fear of the timid, or the apathy of the selfish." But to make that progress secure, we must have unity; and to make that unity respected, we must endeavour so to educate our members, and the public generally, that empiricism may not only be despised, but cease to be profitable.

Some fifty years ago, all that was needed to commence the practice of a Dentist was unblushingly to profess yourself one: few indeed were those who, qualified by study and skilled by experience, conscientiously endeavoured to carry it out in their every-day practice. The Profession was regarded by the many simply as a money-making business, and had the great virtue of being novel. The public, at all times ready to be gulled, fostered the empiric, flocked to his house, paying him nearly any fee he might demand,—only too willing if he would undertake their cases at all. Fifty years ago, an adventurer of this stamp (I take him as an illustration of his class) visited Paris, that he might pick up a smattering of this new and profitable calling. At the end of three months, returning to London, by specious advertisements, by well-got-up circulars, he soon managed to make himself known; his establishments were multiplied, until at length he possessed several houses in London, and had travellers scouring the country for patients in every direction. It is not our office to rake up the grievances of the past, excepting so far as they may be profitable in pointing an example for the future, but the statistics afforded by these notorious empirics are worthy a moment's reflection. The ordinary charge for a set of teeth was one hundred guineas, and it is notorious that in some instances more than twice that amount was demanded; all other charges were in proportion, a common price being five guineas a tooth. Lotions for the gums were made up and sold at one and two guineas a bottle, and boxes of powder at similar exorbitant prices.

Now, if in return for these enormous fees the work had been really well executed, some excuse might have been pleaded, as the science was young and its professors greedy; but, to a certain extent, any rubbish was put into the mouth—badly-fitted plates of gold and silver, marvellously stinted in quantity and disgracefully low in quality, with ill-adapted blocks of bone, and sometimes natural, but more frequently carved teeth. The object of the empirics was to see a patient but once, and make as much as possible out of the first transaction. The class of patients that visited them were for the most part rich, and moved in the best society; indeed, some of the highest members of the nobility. The stratagems resorted to by these harpies would alone fill a volume. Carriages were hired to be continually driving up to their doors, and there to remain, two or three at a time. Well-dressed visitors were paid to fill their waiting-rooms, and to expatiate upon their skill; entertainments of all kinds were given, while their well-worded books and gilt-edged circulars found their way into every house, and their advertisements into every paper.

Can it be wondered at that, with all these auxiliaries at work, the receipts netted by some amounted to as much as 30,000*l*. a year? Can it cause any surprise that the name of Dentist was associated with wealth? But it will be equally apparent that such proceedings were gradually bringing the whole body into disgrace; distrust was creeping over the public mind, the word Dentist became a questionable title, and even twenty years afterwards, when many able men commenced practice, they were hardly received with anything like the respect attached to other professions.

Having now glanced at the Dental Empirics of the past, let us for a moment examine those in practice at the present day; and we fear that while doing so we shall be compelled, with sorrow, to admit that their character remains unaltered. Is it not notorious that monied men are entering the Profession, employing workmen and assistants, and setting aside large sums for the purposes of advertisement, &c., who possess not a scintilla of professional knowledge; and that the public patronise them as of old, pay them heavy fees, robbing in the greater number of instances the honest practitioner, and injuring the public mind? But, after all, the question naturally arises, How is this to be avoided? Educate the public, and let every enlightened member of the Profession in his private capacity take every opportunity of impressing upon society the necessity of a charter, with its pains and penalties, and endeavour to inculcate a thorough distrust in advertised ability.

Let us now inquire what constitutes Dental Empiricism; and we shall try to prove that all systems of obtaining practice, excepting through recommendation, is alike disreputable and dangerous to society. Advertisements may be divided into two classes—inoffensive and offensive. The inoffensive advertisement is simply a change of address, or a card. The offensive is full of professions for the most part untrue, and assertions intended simply to attract attention;—such as the exclusive use of patents where no patents exist; the possession of valuable preparations, it being well known that the materials used in Dentistry are alike open to all; methods of construction under a variety of names, assumed to be only in the possession of the advertiser. We have likewise a series of stereotyped phrases, so grossly untrue that no one possessing one spark of integrity would allow their names to be attached to them; the phrases being not only opposed to scientific experience, but even repugnant to common sense.

The advertiser depends upon his advertisements; and herein lies the grand distinction between him and the honest practitioner. The empiric never desires to see his patient a second time; the advertisement that brought the dupe of to-day will bring him another to-morrow. The non-advertiser feels that his reputation —indeed, his very existence—depends upon his acting honourably to his patient. He can only increase his connection by the recommendation of one to another. The patient may feel confidence that he is dealing with a man who lives only by his good name: not so the advertiser, however honourable he may be (and we will allow they are not all dishonourable),—he obtains his patients in so questionable a manner, that his skill must at all times remain doubtful. If he is a clever man, what need has he of advertisement at all? Ability will sooner or later meet with some amount of recognition; therefore the Dentist who requires advertisement must necessarily be the inferior practitioner, executing the worst work, relying upon his advertisement, without which he would be without patients, as he is without skill.

The answer to much that we have advanced will be, that the private and high-priced Dentist (as the empirics will term him) demands higher fees, and complains at the charges made by the advertiser. This we unhesitatingly dispute, and freely declare that the charges, on the whole, made by the private practitioner are, if anything, less than those of the empiric. It is true, he will not condescend to operate after the advertiser's fashion. Stopping a tooth is not merely filling it with any description of paste; and artificial teeth should possess some amount of finish,—the cheapest not being always considered by rational beings the best. Again, the advertised prices bear no proportion to the prices really charged, excepting in a few solitary instances; for if a man can afford to spend ~~from 200*l*. to 2,000*l*.~~ a year in advertisements, his profits must be obtained from some one.

runds -

The organisation of a Dental College and the formation of a Dental Society are not calculated to check the empiric, excepting in as far as they educate the general public. A vast number of young practitioners have been accustomed to send out a few circulars; but upon joining these bodies they have discontinued doing so, advertising being opposed to the laws they have subscribed to; so that the empiric has even a larger sphere of operation than he had before the formation of these societies. And this is one of the grand reasons why we should pray for a code of pains and penalties. Men who are honourably endeavouring to make a position, feel acutely the injustice done to them by the public, and, but too frequently seeing the success that attends the advertising charlatans (no matter how inferior their ability), are led to join them. Upon these arguments we found our conviction that Dental advertisements are injurious to the public, and ought in every way to be discountenanced.

Another mode of gaining notoriety, or, more correctly speaking, of attracting attention, is by the show-case, which we must also unhesitatingly condemn, and upon these grounds:—The show-case does not necessarily contain specimens of work executed by its exhibitor. Every practical Dentist is aware that these cases may be obtained ready fitted up with work in all styles. But even granting that it is the work it professes to be, it does not follow, however well it may be executed, that such work will fit the mouth, or could be worn with comfort. Some may argue that the show-case is no more than the shop-window, in which is exhibited the wares of the artificer. But the cases are widely different. We may see a chair or a table, a piece of jewellery or a garment, exhibited for sale; we can purchase the chair and place it in our rooms. But such is not the case with a set of teeth. Every customer must be separately fitted, and in no instance could the Dentist remove from his show-case a piece of work and transfer it to the mouth of a strange patient. We know that many regard the show-case as simply emblematic of the Dentist's calling; but upon these grounds we should excuse the exhibition of a golden tooth or a gigantic pair of forceps.

We have penned these few lines in no malignant spirit, but have endeavoured to bring forward undeniable arguments in support of our views. To the younger members of the Profession, those fighting (perhaps despondingly) the battle of life, we would remark that the advertising empiric's successes are not now what they used to be; every day, every hour, the public are becoming better informed, and we sincerely believe the day is not far distant when the empiric will cease altogether to be patronised. Let the young practitioner, though he possess but half-a-dozen patients, do all in his power to convince them that he is thoroughly conscientious; let him also take every opportunity of increasing his store of knowledge; and in the end he will have little or no cause to complain, though his neighbour disreputably canvasses his position inch by inch. Many have tried by advertisement to obtain more rapidly a connection, but have since returned to the true walk of a respectable practitioner, bitterly lamenting their folly.

To those already advertising, we would inquire whether it were not better for them to cease to do so before it is too late; to gather together what connection they possess, and save themselves the thousands they expend, while lowering themselves in the eyes of their Professional brethren.

In conclusion, to all we would express our conviction that by unity, energy, and perseverance, the public mind will become so enlightened, that Dental Empiricism can no longer exist, and that every one endeavouring to carry out this good work will deserve not only the thanks of the Profession at large, but of every right-minded member of society.

EXPULSIVE GENGIVITIS.—The Paris correspondent of the 'Lancet' states that "in a recent communication to the Academy of Medicine, M. Marchal de Calvi dwelt upon a not uncommon disease of the gums and alveoli. This disease, hitherto unnamed, he proposes to call 'expulsive gengivitis,' and as a suggestion of treatment, based upon a series of successful cases, is appended to the essay, I deem it worth mentioning. The affection consists in an inflammation of the gum and of the tooth-socket or its lining, mostly commencing by an abscess, with a subsequent slow inflammatory process. The tooth begins to emerge from its position in the jaw, deviating from the natural direction; the gum recedes, and if the malady be unchecked, the former is completely ejected from its legitimate lodging. The disease is mentioned by English authors, but seems to be, if not unknown, at all events *unnamed* in France, and constitutes the torment and bugbear of many a coquettish middle-aged lady. M. Marchal de Calvi enumerates, as the causes of this unsightly affection—first, hereditary predisposition; next, exposure to damp and cold, the neglect of cleanliness, and presence of tartar round the gum, dyspepsia, or gastric irritation; and, lastly, pregnancy and lactation. The remedy found most successful in cutting short the disease in its early stage, is a *watery* solution of iodine, to be brushed twice daily over the gum; the solution at first to be used weak, and subsequently stronger and stronger, until a concentrated form is tolerated." Appropriate general treatment will also be required in those cases depending upon constitutional derangement.

THE DENTAL REVIEW.

TUESDAY, JANUARY 1, 1861.

EDITORIAL ARTICLE.

With the new year we come before our readers full of expectations, not unalloyed with anxieties. We buried with the last volume all feelings of rivalry, political and general. We transfer the Editorial Essay, now, from the first to the centre page, that we may give to the Science department of our Journal a more conspicuous place; and from henceforth we shall aim, on every occasion (always excepting that no new phase in Dental politics should by necessity draw us from our intention), to cultivate the more congenial part of our labours, and by far the most useful—the scientific, the literary, and the social.

We conceive, indeed, that under existing circumstances we have done all that can be done for the policy of our Profession. We did our best to place Dentistry on an entirely independent footing; and considering the overwhelming weight upon us when we commenced our struggle, we have reason to be satisfied with that which we have done. If, on the one hand, we have not prevented the establishment of the Dental Certificate system by the College of Surgeons from taking effect, we have, on the other hand, contributed effectually to the establishment and consolidation of an independent College of Dentists, and its accessory, a purely Dental School. We are content, therefore, to allow these two systems to rest on their merits, to accept them as accomplished facts, and to let them, so long as the contest is fairly conducted, go their own ways, and be judged by their own deserts.

Apart from all political strife, indeed, we find, ere yet the New Year's day has pronounced its living throb, sufficient before us for the work of another year. In the first place, in order to make our pages the repositories of Dental Science and Literature, we are led to commence the reproduction of some of the works of the more eminent in the past history of our science. Within a narrow limit we shall be able to do this with a considerable degree of perfection, inasmuch as the works that admit of reproduction are neither numerous nor under the restriction of copyright law.

We have commenced this series, naturally, with the re-issue of the great work on the Teeth by John Hunter; and when we state that we have entrusted the editing of this work, together with the construction of a biography of Hunter, to the care of so excellent a scholar and writer as Dr Francis Webb, we feel that for one year we have obtained a sufficiently attractive selection from the past records of Dental progress to satisfy every interested reader and subscriber. The text of the Hunterian work will be illustrated by a series of engravings, not only from the work itself, but from others of more modern date, and from original sources.

As another distinguishing feature of the DENTAL REVIEW, we intend to give a complete Materia Medica of Dentistry. How long, how severely, the want of such a work has been felt, we need not state; how the Medical Profession would get on without a Pharmacopœia or Dispensatory, we need not inquire: suffice it to say, that as yet the English Dentist knows not where to place his hands on an English work to which he may turn for immediate reference to any remedial agent whatever that may be required by him in his Professional avocations. We shall supply this *hiatus*: we shall give in our pages a whole book of Dental preparations, including a concise description of every article that may be required, either for mechanical or medicinal purposes, with an account of its preparation, its application, and the properties of each constituent.

That the direct practical value of our periodical may be sustained, we shall also conduct quarterly, under the head "Summary of Cases bearing on Dental Practice," a history of all recorded facts from the current scientific literature. Towards these collections we shall be glad to receive short original histories of cases from any of our Professional brethren; to whom, one and all, we need hardly offer the assurance, that no political feeling on our parts will influence us in relation to them as men of science, but that we shall give to their contributions honourable place and mention.

It will be our further object still more efficiently to reflect through this Review the current literature of the day, and occasionally to relieve the reader of the heavy strain of pure Professional writing by occasional lighter and more genial essays on topics not apart altogether from our pursuits, but connected with the general rather than the special life of the scientific man and scholar. Finally, retaining that assistance from original contributors from which we have already earned so much credit, and steadily adding to our lists ready and welcome fellow-workers, we look forward with the assurance of a still-increasing support, and to the fulfilment of objects in strict accordance with the steadily-advancing progress of Dental Science.

SELECTED ARTICLES.

TREATISE UPON THE GENESIS AND DEVELOPMENT OF THE DENTAL FOLLICLES TO THE EPOCH OF THE ERUPTION OF THE TEETH.

By Drs Ch. Robin and E. Magitot.

(Translated for the 'Dental Cosmos,' from the 'Journal de la Physiologie de l'Homme et des Animaux,' Dr E. Brown-Sequard, Editor, by E. Sureau.)

PRELIMINARY.

We propose to exhibit in this work the results of our observations upon the mode of origin and the development of the dental follicle, including therein the tissues which bear a part in the constitution of the tooth. Our examinations have been made upon the human fœtus, also upon those of the domestic mammalia, and have been extended even to the reptiles. If we except the differences existing in the form and size of the follicles, we will everywhere find a remarkable uniformity of constitution in all these organs, and a great similarity in the phenomena of their origin and of their development.

This account of our investigations will be divided in the following manner :—

In the first chapter will be described the evolution of the jaws before the appearance of the dental follicles. A knowledge of this is indispensable to a right understanding of the phenomena of the development of the dental follicles and of the teeth.

The second chapter will be devoted to the study of the genesis and constitution of the follicle, considered from the moment of the appearance of the bulb, which is always first produced, until the commencement of the production of the tooth—that is to say, to the birth of the first hollow crown or cap of the dentine.

The third chapter will treat of the manner of origin and development of the constituent parts of the tooth—ivory, enamel, and dentine; and also of the structure of the formative organs of these parts.

Finally, in the fourth and last chapter, we will describe, in discussing them, the processes that have been followed in order to ascertain the anatomical and physiological particularities mentioned in the first three chapters.

The observation of the facts upon which this treatise rests is, if not easy, at least fruitful in results of great accuracy. The transparency of the parts is favourable to observation, and permits great distinctness in following the outlines which limit each of the organs under consideration; these outlines are at first diffuse, then more and more distinct. When an isolated preparation is studied for the first time, it is found very perplexing to give an exact interpretation of such and such of these outlines, or of the nature of the organ limited by them; but as the same preparation may unite in itself a series of juxtaposed follicles, the constancy and regularity of the relations which affect the organs that constitute them give a certain preciseness to the decision of the nature of the objects. Finally, this decision becomes at the same time easy and accurate, when the observation is made on a series of pieces from the same subject at different ages, or on pieces belonging to distinct species. The comparison of these organs at their different periods in the same animal, and the comparison of the follicles in different species, always show similar anatomic relations (excepting some secondary differences in form and size); this leaves no place for doubt relative to the nature and office of each of the constituent parts of the follicular apparatus.

It is astonishing that uncertainty has existed so long in regard to the determination of the phenomena of the genesis and evolution of the teeth. This is, without doubt, the result of the constant neglect of collecting and observing a series of preparations, corresponding to the successive phases of the same phenomenon in different animal species.

When the constituent parts of the follicle are completely collected and grouped in their reciprocal relations, each follicle soon becomes too voluminous to be observed in its entirety by the aid of transmitted light. By the time that the various organs of the follicles are individually more developed, and more easy to dissect, the advantages of their transparency and the simultaneous observation of all the tissues in process of evolution are lost on account of their size. But in compensation for this, the anatomic nature of each organ can be determined at this time, and even at anterior periods, by detaching from each of them such a fragment as is sufficient for microscopic observation.

It is important to mention particularly that even at its first appearance, as well as later, each of these constituent parts has an anatomic composition and a texture peculiar to itself. The differences of texture between the constituent parts of the follicular apparatus are so great that the observer is necessarily led to call in question the descriptions given by the numerous authors, who have studied the development of the teeth without taking into consideration the intimate anatomical nature and the characteristics of the texture established by microscopic observation in the parts that they have described.

It is evident that there are two methods of arriving at a precise determination of the nature of the parts constituting the follicular apparatus, however minute or delicate they may be. These two methods are—

1st. The study of these organs in the order of their successive appearance, and their reciprocal relations at the time of that appearance.

2nd. The examination of the anatomical composition, and of the intimate texture of each of these parts, not only at the time of their appearance, but during all the successive phases of their evolution.

In the first case, the physiologist observes the whole of the follicular apparatus by the help of transmitted light—an observation rendered easy by the minuteness of the organs which it contains.

The second case requires the individual examination of each organ that can be isolated by dissection. This examination is made equally possible by the facility with which the small organs, that constitute the entirety of the follicles, can be detached from each other.

The follicles include under a small volume (at first very transparent) parts that differ widely in their anatomical composition and in immediate juxtaposition—viz., the bulb and cells of the dentine, the follicular wall, the organ of the enamel and its cells, followed shortly by the enamel, the ivory, and, later still, the cement. These particularities make it possible to observe the origin and development of very distinct tissues almost with a glance of the eye. This fact is of very great interest to general anatomy, allowing as it does an accurate observation and comparison of facts, which in other tissues must be observed separately, in parts of the economy far removed from each other.

CHAPTER FIRST.

EVOLUTION OF THE JAWS PREVIOUS TO THE APPEARANCE OF THE DENTAL FOLLICLES.

There exists such a unity between the development of the teeth and that of the maxillary bones, that we have been led, almost against our will, to study the changes that occur in the constitution of the jaw, before and during the evolution of the follicles. We have found that it is impossible to comprehend fully the description of that evolution without a previous knowledge of these changes. The consideration of these has led us to treat in this chapter: First, the order in which the various parts that constitute the jaws appear; second, the jaws before the appearance of the dental bulbs; third, the jaws at the time of the origin of the follicles. Each of these subjects will be considered in a separate paragraph.

Section 1. *The order of the appearance of the various constituent parts of the jaws.*—The two jaws originate with the aid and at the expense of the first embryonic visceral arch; this is also the case with the soft parts that accompany them. They appear under the form of papillæ or bourgeons (called *maxillaries* by M. Coste, in accordance with that which is learned from their ulterior evolution), These bourgeons (*sprouts*) are situated underneath the embryonic encephalic mass or cerebral capsule.*

In the human fœtus at fifteen or eighteen days, the lower jaw is represented by two small tubercles, which are the tongues of origin of the principal part of the first visceral arch. The superior maxillary bourgeons, less advanced than the preceding, are placed upon the sides and a little higher than the embryonic *frontal apophysis* or prolongation of the anterior cerebral cell. They are a dependency and a prolongation of the external side of the base of the tongues, or inferior maxillary bourgeons, and are consequently part of the first visceral arch.

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* It is known that since Rathke (1826) the name of *branchial* or *visceral arches* has been given to some transitory embryonic organs disposed under the form of arches at the anterior or *cephalo-cervical* extremity of the embryonic vertebræ; they are five in number in birds, and four in the mammifera, and are superposed from below the *cerebral capsule* to the level of the heart. They are contiguous, but distinct and narrow slits, called *branchial* or *visceral slits*, can be seen between them. It is by the aid and at the expense of their tissue that the different sub-cranial organs of the face and all those of the neck successively originate. They appear, one after the other, from the top downward, as soon as the cephalic extremity of the embryo is separated from the blastoderm, and under the form of *bourgeons* or *tongues* (at the blunt extremity) which proceed from the base of the cerebral capsule as soon as the *visceral or ventral laminæ of the body* of the embryo are closed. These *tongues*, called *branchial* or *visceral*, converge at each side below the cerebral capsule toward the median line, and it is in uniting that they form arches; at the same time the ventral laminæ disappear at this level. The first arch is the largest, the second a little less, as are likewise the others, which show themselves when the first have already commenced to give origin to definite organs. One of the authors of this treatise has frequently proved that they are not formed by the embryonic cells, but by the embryo-plastic nuclei, and are covered by a unique range of epithelial mosaic-like cells.

Toward the 25th or 28th day, the embryo being nearly thirty millimetres (1·18 inch) in total length, the inferior maxillary bourgeons are united upon the median line; and the superior bourgeons, always isolated, have descended to the level of notch of the frontal apophysis. From the 30th to the 35th day the tubercles or incisive bourgeons commence at the end of the latter, and, separated at first by a groove, they unite in one median part near the 40th day, but only at their anterior edge; each bourgeon exhibiting behind this edge a prolongation in which the intermaxillary or incisive cartilage is developed. Near the 40th or 45th day each of these prolongations unites at its exterior side with the corresponding superior maxillary bourgeon, without being yet joined to its congener upon the median stem. The arch of the upper jaw is formed about twelve or fourteen days later than that of the other. In this jaw the incisive prolongations remain free behind at their internal edge alone, uniting at the median line in order to form the palate, only about the 60th day. Thus the upper jaw owes its formation to four bourgeons, of which the two exterior (maxillary bourgeons) represent the body of the jaw, and belong to the first visceral arch; the two middle ones soon unite into one, called the incisive or *sous-cloison* (sub-partition), each corresponding to the part of the maxillary called the incisive or intermaxillary bone. These last do not proceed from visceral arches, but from the olfactory prolongation of the embryonic frontal apophysis.

The maxillary bourgeons are then composed exclusively of embryo-plastic tissue, formed particularly of nuclei of that name, and of a little interposed amorphous matter, and covered with an epidermis of mosaic-like cells.

The cartilages appear in the heart of these bourgeons, some time after their union, in exactly the same order as the bourgeons themselves, viz., two inferior maxillary cartilages, two superior maxillary cartilages, then, a little later, the two incisive cartilages. The origin of all these takes place by the method called *genesis*.

At this moment, the portion of primitive embryo-plastic tissue comprised between the superficial epithelium and the central cartilage already includes a certain number of laminated fibres, some complete, and some still in the form of fusiform bodies. These laminated fibres are then developed and multiplied in order to form the mucous membrane, while the epidermic bed increases in thickness.

A short time after this is developed the more transparent bed, corresponding to the sub-mucous laminated tissue, and then, in the midst of the central cartilage, appear the first points of ossification.

Finally, following this series of phenomena, and at a period varying between the fiftieth and sixty-fifth day after conception, little opaque, conoid masses appear in the heart of the sub-mucous tissue, filling the groove of the maxillaries; these are the first vestiges of the bulb by which the appearance of each follicle commences.

(To be continued.)

TOBACCO—ITS EFFECTS UPON THE GENERAL HEALTH, AND ITS INFLUENCE UPON THE TEETH.

(From the 'American Journal of Dental Science.')

We have been induced to offer the present article as much to present some interesting facts which have recently appeared in treatises upon the subject, from which we shall borrow largely, as to advance the idea that it is in some cases preservative of the teeth.

We are no apologists for the filthy abuse in the use of the weed, but advocate the position of judging of it according to its analytical qualities and their effects upon the system, not screening the great social misdemeanour of which it is too often the disgusting evidence. Kingsley is nearly right when he says "man is a smoking animal," for it especially signalises him from all other animals, for about three centuries has it been gaining ground until all civilised nations use it extravagantly, and many of the uncivilised and barbarous do likewise.

It will be useful to our purpose to know by figures how general this use is, so as to draw a conclusion of its vital effects. A writer states that "the tobacco zone girdles the globe." From the equator through fifty degrees of latitude, it grows and is consumed on every continent. All classes, all ages, in all climates, and in some countries both sexes, use tobacco to dispel heat, to resist cold, to soothe to reverie, or to arouse the brain: in Great Britain 17 ounces per head, France 18½, Denmark 70, Belgium 73½, New South Wales 14 lb., and supposed to be much greater in some of the States of North America. The average for the whole human race of one thousand millions has been reasonably set at seventy ounces per head, or two millions of tons, requiring five and a half million acres of rich lands to produce it: of this the United States alone raised in 1850 two hundred million pounds, at the same time importing eighty-two million pounds from Turkey, Germany, and Cuba, giving about three pounds eight ounces per head to our population.

These figures, we think, with the writer, must lead us to conclude that it cannot be so deleterious to the body and mind as the anti-tobacconist would lead us to believe, "or whole nations would have been extinguished under its use." Many mighty ones have used it for centuries, and show no aggregated deterioration, individual exceptions being allowed, arising from idiosyncrasy or beastly excess, having no weight in the argument: nor will we ponder to moralise upon the cause inducing man to resort to narcotic stimulants, or any other of his characteristic habits; suffice it that he is, beyond all other creatures, the tobacco consumer; our object being to find if this is necessarily injurious, if statistical facts prove that it is destructive to the race, either physically or mentally.

In the first place, we start with the proposition that the intellectual condition of certain leading nations is greater than at any previous period, and to all observations making more rapid and powerful advances at this time than at any previous period of their history. We will cite North America, England, France, Germany, Prussia, Belgium, &c., as examples. The records of longevity in these different nations, although in certain localities showing great fluctuation, in the aggregate establish the fact that the term of life is gradually being prolonged. Instead of any of our most enlightened nations stagnating or deteriorating, they are steadily advancing towards an improved condition of health, proven by the average life of man being greater; at the same time we have the coincidence of an enormously increasing use of tobacco, increase of size, weight, strength, and endurance.

All European travellers unite in stating that the armour worn by the ancient as well as more modern warriors would be much too small for the average men of the present day. The celebrated Black Prince must have been a man whose stature was five feet eight, and weight of about one hundred and forty pounds, less than the generality of men of our times. Of this the writer is confident, having examined the breast-plate, casque, and shield critically, as well as many other well-known genuine suits, most bearing conclusive evidence of this fact.

The recent wars in different parts of the world show no decrease in man's power of bodily endurance, as may be instanced in the Crimea, as well as in India, where hunger and fatigue were borne by masses of men almost unequalled; where often the only full supply of wants was in tobacco, which proved a sufficient support until more material aid was found. So too in our recent Rocky Mountain expedition, where it proved of the greatest importance and was missed more than the expenditure of any other supply, until a temporary substitute was had in the dried bark of the willow.

We must presume that these points will be conceded—that greater progress has been made coincident with the increasing use of tobacco, by nations who use it most extensively. We therefore have no evidence to prove that it has had a deteriorating result, whilst it may be more reasonable to infer that it may have had a rather good than a bad effect, from the fact of these acknowledged improvements occurring during its greatest use.

Little is hazarded in saying that the great majority of our men of science, art, and literature have indulged in the use of tobacco more or less extensively, many performing their best labours under its enjoyment, and judging from our personal observation, tobacco-users live to a ripe old age.

We will now glean from various published documents its chemical characteristics, in the hope of discovering what the true nature of this remarkable plant is. The active matter of the leaves is found to be resident in a volatile alkali, *nicotin*, and a volatile oil, *nicotianin* ; a third is eliminated under great heat, *empyreumatic oil*. These are the active principles involved in inert matters found in most vegetable formations, as starch, gum, albumen, resin, lignin, with the organic acids in varying proportions, as is the case in other plants. The inorganic salts predominate in tobacco, as those of lime, potassa, ammonia, &c., as do highly nitrogenised substances, making it one of the most exhausting of crops.

Orfila says that *nicotin** has the greatest power to resist decomposition in the decaying tissues of the body, it being found in animals destroyed by it months after their death. It exists in greater or less proportions in all tobacco, but is generally very small in quantity, is a most active poison, odourless, has an acrid and burning taste, as found in the plant is not volatile, and in treatment alkaline. The latter tobacco has least in quantity, ranging in the mild from two per cent. to eight in the rankest.

Nicotianin, as it exists in tobacco, is a mere fact of the laboratory as well as the alkaloid just noticed, except in smoking, for ordinary chewing does not exhibit it to any degree, except that the peculiar smell is thought to be attributable to the volatile oil of which we are now treating. It constitutes but a very slight proportion, for even by distillation one pound yields but two grains, being one-half of one per cent., age supposed to increase this quantity. When inhaled or smelt, it produces sneezing, but taken as medicine in sufficient doses excites vomiting and giddiness. Both of these principles are active constituents of tobacco, *nicotin* predominating, and is perhaps much the most important, it being almost impossible to inhale any proportion of its fumes, a single drop destroying any small animal, whilst one grain has been taken of nicotianin with impunity.

It is difficult to imagine the third constituent of tobacco, empyreumatic oil, even by experiment, as separate and distinct from the two first principles, it being an oil like nicotianin, which is comparatively inoperative, but involved with a base of strong narcotic poison, which is destroyed by washing the oil with nitric acid, showing its affinity to the base nicotin, both losing their narcotic, poisonous character by treatment with this acid. Indeed, the two former most probably can be found in this oil, which is produced by combustion in partly-closed vessels, as the common pipe, and is the colouring material of the German meerschaum clay. The writer from whom we have borrowed so freely says, nicotianin, from its feebler action and small amount, is not a very efficient principle in producing the narcotic effects of tobacco, and that the empyreumatic oil consists only of fatty matters holding the alkali in solution. We are forced to believe that the only constituent worthy of much attention, as the essence of the plant, is the organic base, nicotin or nicotia.

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* It has recently been proposed as an antidote for strychnine.

The great question to be solved is, how much of this is absorbed into the system in its uses; and if absorbed, how does it act, for after all we must judge by the effects produced. In smoking, the heat is but sufficient to volatilise a perceptible portion, which is either ejected, or the mouth protects itself by its secretions, and of the supposed two per cent. scarcely a part could be absorbed without the usual symptoms attendant upon its exhibition, and which is only apparent as long as the system has not protected itself against its attack, as in its early use, when all of its injurious effects are no doubt made particularly evident.

The abuse of the most wholesome aliment is attended with injurious consequences, the most appropriate remedy pushed too far becomes a deadly poison at times, and tobacco as vulgarly used may be equally pernicious. But if this is so dreadful a poison, its almost universal use should enable us to determine its exact action, and see its results immediately, as in all other similar conditions of slow poisonings, as it is claimed to be.

The opium-eater gives indubitable signs of approaching decay at an invariably early age, besides having a peculiar bodily indication of his habit, as well as mental hallucination; so with hatchis, so with intemperate drinking; but tobacco is the regular companion of most of our old men, and is not commonly attended with any physical change or appearance except it be in individual cases and in its beastly use. Mankind universally indulge in fruit and other food from which chemistry enables us to distil fearfully rapid poisons; and judging these by the results of their analysis, we would be all slowly but certainly destroying ourselves. Common salt contains the deadliest vapour, chlorine; yet from experience who would denounce its use?—indeed, is it not imperatively demanded by the instinct of all animals? Most fruit contains more or less of prussic acid, a poison quite as active as nicotin, the former more abundantly found in the peach, plum, and some nuts, than the latter is in tobacco; yet the imagination of man has not yet attacked these luxuries, as they only come occasionally and are universal indulgences.

No fact is more clear to the true chemist than that the result of his analysis is one thing and that of its chemical appropriation quite another, so that it is neither safe nor reliable to compare the two products. Nature appropriates or rejects the elements brought in contact, by bringing to bear elements and forces quite inscrutable and unknown, often changing instantly the destructive matter into the inert or useful, so that we are ever driven, in such questions, to seek for the known physiological effects from which to form our opinions. Here we take issue with the opposition, and claim that the positive proof of the injurious effects of tobacco is wanting, except in some few exceptional cases, which prove nothing.

The immense indulgence of tobacco must, if injurious, be capable of abundant evidence, and this has never been fairly or fully shown. The mere fact of a man dying who used tobacco, or of a development of cancerous growth in the mouth, prove as well, in the first instance, that death ensued because a sufficient quantity was not used, and in the second place that an hereditary cachexia had been developed by an incident not at all connected with the cause. This wide-spread instinct must have solid and undeniable proof to check its wonderful increase, not its mere denouncement, for there is a singular inclination to believe in the beneficence of some luxuries and pleasures the temperate enjoyment of which man so eagerly, and we say, so harmlessly, finds comfort in.

The only fact established worthy of consideration, is the waste of the secretions of the mouth, which is said to produce derangement of the digestion. That a large amount of the saliva is thus wasted, and if no compensation is made by the system for this loss, injury must inevitably result, but that indigestion follows as a necessary consequence, is by no means proven, for the most frequent sufferers from indigestion are women who never use tobacco; nor has our observation established the fact that tobacco-users are more liable to this malady than others.

We are compelled to think that the system compensates for this waste of the saliva by increasing the amount of the secretion, experiment establishing the fact that its quantity does not deteriorate the quality: if one pound and a half is the common quantity secreted, three times this weight can be produced without deranging its office in the stomach, a quantity quite sufficient to supply the wants of the system, and the most abandoned use of tobacco.

Physiology determines the use of this secretion to be two-fold—first, the moistening of food, and secondly, the conversion of farinaceous substances into sugar; and as this is so essential a feature in digestion, Nature has supplied a reserve force in the *pancreas*, which has been determined by Kölliker and others to secrete an exactly similar fluid, which is discharged upon the food just after it leaves the stomach; so that if any starchy matters have failed to become sufficiently saccharine for suitable appropriation, this gland supplies the want, and, like all other glands, is capable of increasing its usual supply to a sufficient extent.

Food is the natural stimulant of the salivary secretions; they are also excited by any mechanical substance placed in the mouth: tobacco is, however, the direct stimulant of these glands, and must be regarded not as the source of injury in its use, for the power of the system to fully supply an almost unlimited demand is abundantly established by experiment. An apparent exhaustion by any artificial means will be at once corrected by a resort to the natural excitant, food, of almost any savoury kind, showing that Nature has power to reserve this secretion for natural demands. The injurious effects of tobacco must be found to attack some other function than that of the salivary secretion, and this has been supposed to be in its action upon the nervous system.

This vague and indefinite charge, like the others against the use of this plant, is quite out of the domain of positive proof. Reasoning by analogies, however, we are induced to draw rather a favourable hypothesis of its action upon the system, not forgetting that there are many idiosyncrasies quite incompatible with any habit out of the ordinary economy of nature.

Tobacco acts generally as an excitant, and is an active stimulant to the nerves of sensation and emotion: thus its pleasurable effects are derived. It stimulates the brain proper, and until habit has modified its action, is followed by a depressing influence, which eventually becomes by continued use of a sedative character, lulling and soothing to the individual. It certainly has no direct action upon the sympathetic system of nerves, except when swallowed or used medicinally, and then it acts as a powerful revulsive.

As usual, its action must be promotive of bodily comfort, reasoning from the laws of general health. In digestion its consequences must be, if any, in the stomach, by depriving it of the salivary secretion of the mouth, whilst the food is in this cavity; but when once the aliment has entered the stomach, the availability of the secretion is prohibited by dilution and absence of contact. Digestion must proceed according to the powers of the stomach, and suitable appropriation take place according to the perfection of this process and the assimilating power of the system. Now, all influences disturbing these processes act injuriously by diverting the concentration of vital action from the stomach and assimilative organs, and that which will remove any obstruction to digestion must necessarily allow a fuller action by removing impediments more or less great. Tobacco, therefore, in its sedative and narcotic influence upon the emotions and brain proper, relieves digestion of diverting influences, having similar tendencies as sleep, which allows all the vital force of the body to concentrate itself in the great work of digestion.

Opium acts very differently by first narcotising and then irritating, acting as well upon the sympathetic nerve as upon the brain, exhausting and paralysing in its ultimate effect.

(To be continued.)

PROCEEDINGS OF DENTAL SOCIETIES.

COLLEGE OF DENTISTS OF ENGLAND.

MONTHLY MEETING, November 6th, 1860.

The President in the Chair.

The first of a series of Monthly Meetings for the reading and discussion of papers relating to Dental Science was held on the evening of Tuesday, November 6; George Waite, Esq., the President of the College, in the Chair.

In opening the proceedings, the President remarked that it had been suggested by several Members that they should resume their Monthly Meetings. He regretted greatly that the leisure of the Council did not admit of their organising the necessary arrangements. A Committee, consisting of Members of the College and Council respectively, to be elected annually at the commencement of the Session, had been nominated by the Council. To these gentlemen would be entrusted the arrangements for the Session, and he sincerely hoped that their Meetings would be the means of bringing forward papers and objects of interest worthy of their careful attention and consideration. Having made these few remarks, he called upon the Secretary of the College to read the Bye-laws which had been prepared by the Committee for the regulation of their proceedings.

The Bye-laws, as read by Mr Rymer, having been duly proposed, seconded, and carried, the following gentlemen were elected Members of the Committee :—Messrs Hulme, Perkins, Runting, Vidler, Weiss, and Williams. Mr Williams was appointed General Secretary, and Mr Weiss Recording Secretary.

The formal business of the Meeting having been transacted, the President stated that the time at their disposal would not allow of a paper being read that evening. There were, however, several specimens on the table, which the gentleman who had exhibited them would bring before their notice, and he hoped that those who were present would favour them with their opinions upon the various objects which were before them.

Mr Perkins said that he had been requested to introduce to their notice specimens of a new description of steel, called Taranaki steel, from which various Surgical and Dental instruments had lately been manufactured. Mr Hallam, a well-known instrument maker, had forwarded some instruments for the inspection of the meeting which were made from the steel in question, and which he (Mr Hallam) stated were of a very superior quality, owing to the peculiar properties of the material employed.

As to the nature or quality of the steel in question, Mr Perkins could not from his own experience speak; the only information he had received upon the matter had been placed in his hands that evening, in the shape of a note from Mr Hallam. In that note, Mr Hallam stated that an English traveller, in passing through a place formerly called Taranaki, but now New Plymouth, had observed that the sand on the seashore was very black and heavy, and, upon examination, he found that the magnet attracted it. In consequence of this, he collected a quantity of the sand, upon the supposition that it must be a particular kind of iron ore, and brought it to England for the purpose of ascertaining its nature and value. He applied to a manufacturer at Sheffield, who placed a portion of the sand in a crucible, and having brought it into a state of fusion, poured it into an ingot-mould, and was much surprised, upon its cooling, to find that he had by simple fusion produced a bar of steel of the very first quality. As the method of producing this new description of steel is very different from that by which ordinary steel is made, he would endeavour to give them a short description of the process formerly employed for its production; at the same time, it must be borne in mind that the subject was one to which his attention had not been directed for a very long period, and that upon the present occasion he had been requested to speak upon it without any previous notice. Under these circumstances, gentlemen must excuse any little inaccuracy which might occur in his description. He would not attempt to describe the latest improvements, but would, to the best of his recollection, describe the old process, which in many respects resembled the present method of manufacturing steel.

Before describing the process, he would mention that steel consisted simply of iron and carbon. All steel was iron previous to its being made into steel: it was therefore necessary to procure iron as nearly pure as possible before the process of conversion into steel could be attempted.

In this country, iron was produced from different species of iron ore. These ores had to be subjected to a variety of processes, such as roasting or calcining, whereby the carbonaceous, sulphurous, and volatile matters were principally got rid of; the ores had then to be subjected to the smelting furnace, from whence iron was produced in a liquid form: this was *cast* iron. The cast iron thus produced was next subjected to the refining process, by which it became more pure; and, lastly, to a process called "puddling," by which means it was brought into the malleable state, known as wrought iron. If, after these various processes, the iron was sufficiently pure, it was then fit for conversion into steel.

He might state here that the principal difference between cast iron and steel was that cast iron contained an excess of carbon, probably from 4 to 5 per cent., while steel contained always less than 2 per cent. The refining and puddling processes were necessary to get rid of the carbon, in order to produce wrought iron; but it became necessary in converting wrought iron into steel to *recarbonize* it to a certain extent. Recarbonization was effected by a process called "Cementation." This was performed in a furnace of large dimensions, some forty or fifty feet high. In the furnace were placed troughs, or square-shaped crucibles, into which a quantity of charcoal and common salt was placed; upon this a row of bars were laid so as not to touch each other; these were covered with the charcoal mixture, and then another layer of bars, and so on, bars and charcoal, until the troughs were filled; the top was then covered, to prevent the access of oxygen to the iron and charcoal; the furnace was then lighted, and a certain amount of heat carefully kept up for several days, after which it was allowed to cool. The bars, upon being withdrawn, were found to be covered with blisters; and the metal had become coarse in its grain, and very brittle. In that state it was termed "blister steel." By reheating two or three times and hammering, it became that milder kind of steel known as "sheer steel." Cast steel was produced by taking blister steel and breaking it into pieces, which were put into a crucible; the crucible was then placed in a furnace, and the steel melted; after which it was poured into a mould, and, when cooled sufficiently, was taken out and reduced into any desired dimension by means of the hammer.

From this hurried description of the common method of producing steel, it would be seen that the Taranaki steel possessed a very great advantage in point of economy, and, as Mr Hallam stated, also in quality, which could not fail to bring it into general use, supposing a sufficient supply could be obtained.

The sand from which this steel was obtained, a specimen of which Mr Hallam had forwarded for inspection, appeared a good deal like the magnetic oxide of iron: it would seem, however, from the steel produced by its fusion, that it possessed just the proper amount of carbon, and was what might be termed a natural steel. In conclusion, Mr Perkins would add that, although iron was mostly and in the greatest quantities produced from iron ores of various kinds, yet that it did occur in an almost pure state, and fit for immediate conversion into steel: he had himself seen some specimens of this kind; one in particular, which came from Mexico, was exceedingly pure, very tough, and white in its texture; its weight was over sixty pounds, and in appearance resembled the half of a large cannon-ball, the under part of which appeared to have been in a state of fusion, causing it to assume the form of the earth, on which it would seem to have been placed in a semi-fluid state. He believed there were many specimens of this kind in South America.

Mr DUBOIS described a peculiar case of loss of teeth and bone in the superior maxillary. At the age of eleven, the patient (now a woman of forty) was in the habit of pricking the gum with a needle (but more likely a pin) between the teeth. After a short period, a small abscess appeared on the anterior surface of the jaw, which spread in such a manner that the processes became affected, and at length the soft and osseous parts were excised at an hospital in Paris, where the patient remained for four months, until cured, and has subsequently worn a piece of artificial work.

Mr HULME exhibited an unusually large specimen of Salivary Calculus. The entire mass was about the size of a pigeon's egg, and weighed just upon two drams. The calculus was pear-shaped, had a somewhat irregular surface, exhibiting here and there a scaly appearance, and was of a yellowish white colour. This concretion was removed from the left side of the lower jaw of a man between fifty and sixty years of age. A tumour had gradually formed beneath the mucous membrane of the mouth, between the posterior part of the tongue and inner surface of the jaw, opposite the alveolus of the second molar tooth. After the removal of the calculus, the man had a very severe attack of erysipelatous inflammation of the neck and face on the same side, accompanied by the formation of abscesses.

A short discussion ensued, in which Mr Weiss, Mr Perkins, Mr Hulme, and the President took a part.

The paper announced for the next Meeting was by Mr Hulme, on "Calcification of the Dental Pulp;" and Mr Robinson was proposed as Chairman for the next Meeting.

A vote of thanks to the Chairman having been passed, the proceedings terminated.

MONTHLY MEETING, Dec. 4th, 1860.

James Robinson, Esq., Vice-President, in the Chair.

The second Meeting of the Session was opened by the Chairman, who said that he had no occasion to introduce Mr Hulme to their notice, as he was so well known to them by his many valuable papers and lectures, that he felt fully convinced the paper of the evening would prove most acceptable.

Mr Hulme then read a paper "On the Calcification of the Dental Pulp." The Author commenced with some remarks upon the physiological condition of the teeth in relation to the various injuries and diseases to which they are liable. It was shown that after the tooth was completed, the pulp appeared to remain in a quiescent state for some years; but that, after a time, it resumed its original office of calcification, and that the cavity of the tooth became diminished by the formation of additional dentine. The same effect followed, but in a somewhat different form, from the injuries which occurred to the teeth by the wearing away in mastication, or by the pressure of wires or bands supporting artificial teeth. Caries was another and the most frequent cause, superinducing the formation of additional dentine. This it did in two ways: first, by calcification in connection with the original bony structure of the tooth, and also by the actual ossification of the pulp. The paper concluded with a practical application of the facts which had been related to Dental practice; the Author suggesting that, by a proper treatment of the tooth, and by relying upon the resources of Nature, many teeth might be stopped with the preservation of the pulp instead of destroying it, and filling the fang in the manner which had been so strongly advocated of late years, especially in the American journals.

After the reading of the paper (which will be found at another page), the Chairman confirmed much that had fallen from Mr Hulme, and strongly recommended the examination of all teeth brought under the practitioner's notice, not only externally, but in section.

Dr Purland, in a few remarks, dwelt more upon the treatment of carious teeth preparatory to their being stopped.

Mr Waite considered Mr Hulme's paper possessed great interest. Most old practitioners had noticed the calcification of the dental pulp, more particularly when teeth became worn down, so that these deposits were freely exposed. Mr Waite proceeded by giving a cursory account of his treatment of exposed pulp, which led to a discussion on escharotics and stopping generally, in which Mr Waite, Mr Perkins, Mr Hulme, and the Chairman joined.

Mr Weiss agreed with Mr Hulme, that by making a variety of sections of teeth many very valuable specimens might be obtained. It had been a favourite study of his, and he had noticed calcification of the pulp under some of the circumstances mentioned by Mr Hulme. He possessed a tooth, taken from the head of a patient at the age of ninety-one, where the pulp cavity appeared to be perfectly calcified. He might also observe, that he had noticed deposits of bone under a gutta-percha stopping. He would inquire of Mr Hulme, was calcification attended with any pain, and what length of time did it take in its formation?

Mr **Rymer** considered that it would be very desirable to ascertain the time occupied in calcification, as a means might be thus obtained of preserving a tooth preferable to any covering of bone or quill preparatory to stopping.

Mr **Hulme**, in reply, stated that he had not yet succeeded in obtaining a section of a tooth in which the pulp was perfectly calcified, and that such specimens were extremely rare; but that the formation of masses of secondary dentine and partial ossification of the pulp were, on the other hand, just as frequent. In answer to a question from Mr Henry, he said that in the Walrus, Elephant, and Sperm Whale, the formation of nodular masses of irregular dentine was of constant occurrence. With regard to the length of time occupied in the formation of either secondary dentine or ossification of the pulp, he agreed with Mr Rymer it would be a great desideratum if some defined idea could be obtained regarding it. He regretted he was unable to afford any positive opinion on that point, but he could state that a very advanced stage of caries was frequently no hindrance to the continuation of the process, as far as regards the ossification of the pulp.

Dr **Purland** introduced some new instruments made by Mr Hallam, and also specimens of C. S. Rostaing's new compounds for taking impressions of the mouth for filling tender carious teeth, and as a base for artificial teeth.

A vote of thanks having been unanimously accorded to Mr Hulme for his very able and interesting paper, and to Mr Robinson for his kindness in presiding on this occasion, the Meeting was adjourned to Tuesday February 5th, when a paper will be read by Mr Weiss "On the Application of hardened India-rubber to the Manufacture of Artificial Teeth." Dr Purland was elected Chairman for the evening.

ODONTOLOGICAL SOCIETY OF LONDON.

ORDINARY MEETING, December 3.

W. A. Harrison, Esq., President, in the Chair.

At the meeting of the Odontological Society held on Monday evening, December 3rd, 1860, the President in the chair, a letter was read from Mr George Frederic Fox, of Gloucester, recommending the use of a hydraulic press for the purpose of making gold plates, the process of squeezing up the plate producing a more accurate fit than the process of beating with a hammer. The price of the press is 12*l.* 10s., and is manufactured by Tangye Brothers and Price, of Birmingham.

A paper was read by Mr Coleman, "On a Method of Treating the Dental Pulp when Suppurating, or in other Stages of Inflammation, with a view to produce Calcification." The paper was in answer to a question put at the last meeting of the Society by Mr Cartwright—viz., "as to whether a dental pulp that has been in a suppurating condition can ever take on a healthy action and become calcified." Mr Coleman endeavoured to show that this reparative process had taken place in a carious bicuspid tooth which he had treated with a strong solution of tannin in ether. The treatment was continued from the 21st of October until the 26th of January, when the tooth was stopped with gutta-percha. The solution of tannin in ether is prepared by dissolving as much of the tannin in ether as this solvent will take up in the cold, filtering the fluid, and allowing a portion of the ether to evaporate at the ordinary temperature of the atmosphere. The writer considered that the effect of the solution upon the decalcified dentine of the tooth is to form a sort of leather—he believes, a true tannate of gelatine or analogous substance; and in cases where the pulp has not been actually exposed, although pain may have been experienced in the tooth, a covering is formed, under which calcification of the pulp seems to take place very readily.

A discussion ensued, in the course of which Mr Tomes related a case in which the pulp of the tooth was exposed by the removal of the decalcified dentine, and the injured vessels bled freely. After the bleeding had ceased, the cavity was filled with Mr Jacob's gutta-percha, without protecting the pulp by any special covering. At the end of three months the gutta-percha was removed, and the pulp had perfectly calcified at the point at which it was previously exposed. The tooth was then filled with gold. The same gentleman stated that for some twelve months, or possibly two years past, he had been in the habit of taking a saturated solution of tannin in spirits of wine, and adding a certain amount of gum-benzoin; the advantage of gum-benzoin over other gum-resins being, that it does not precipitate the tannin. By the addition of gum-benzoin, you produce a thickish solution, which will remain with but little change in the tooth for several days, during which time the benzoin prevents the tannin being washed away by the saliva.

Mr SERCOMBE protested against the indiscriminate use of arsenic for the purpose of destroying the pulp of the tooth. He preferred treating it with a solution of nitrate of silver or sulphate of zinc. With respect to the etherial solution of tannin, recommended by Mr Coleman, it appeared to him that ether softened the bone, while spirits of wine, on the contrary, hardened it.

The PRESIDENT said that his experience was unfavourable to the chances of success, as a general rule, from any plan he had tried when the pulp had once taken on a suppurating character or a secreting surface, treat it in whatever way you will. With regard to the injurious effects produced by the use of arsenic, he thought it right to say that, having employed it very largely, he had never found any such inconveniences arise from it as had been mentioned by Mr Sercombe. After destroying the pulp, it was his practice to fill the pulp cavity and the fang, or fangs, as far as he could; but as to drilling to the bottom of the fang, which so much had been written about, he confessed he had never attempted it. He did not know how it was possible to judge of the length, thickness, or straightness of the fang of any tooth, so as to render it a safe operation.

Mr DREW confirmed the statements of Mr Sercombe with regard to arsenious acid. He had not heard any mention of potassa fusa, which he had often found extremely useful. He applied it on cotton wool, in the proportion of four or five grains to a drachm of glycerine, rubbed down in a glass mortar. Another mode of treatment which he recommended was to mix powder of magnesian limestone, say four-fifths, or three-fifths in some cases, with two-fifths of quicklime; and he had found it form a tolerably compact mass when placed over an exposed pulp.

Considerable discussion ensued on the plan proposed by Mr Drew; after which the President reminded the Society that the question which had been previously asked by Mr Cattlin—viz., whether there was any symptom or symptoms by which it could be determined when calcification was going on—had not been answered. No reply being made, the meeting proceeded to the election of Auditors, and was then adjourned.

CERTIFICATE OF MEMBERSHIP.—The following are the names of gentlemen to whom Certificates of Membership have been granted since the publication of the List of Members in October last :

Belisario, John, Sydney, New South Wales.
Brooks, Robert Heygate, Banbury, Oxon (by examination, October 31st).
Cameron, Thomas R., Paisley.
Canton, William Laurence, Hanover street, Hanover square (by examination, October 31st).
Carter, John Henry, Wakefield.
Chapman, William, Maddox street, Regent street (by examination, October 31st).
Finzi, Samuel Leon, York place, City road (by examination, October 31st).
Little, Stephen, Bristol (by examination, October 31st).
Lloyd, Francis Robertus, Agra, India.
Lows, Andrew, Carlisle.
Newman, William John, Liverpool.
Robertson, James, Bath.
Rose, John Frederick, Preston.
Snape, Joseph, Chester.
Spencer, Harry Lyus, Orchard street, Portman square (by examination, October 31st).
Sutcliffe, James, Bradford (by examination, October 31st).
Turner, James S., Margaret street, Cavendish square.
Wainwright, John, Bridge road, Harrow road.
Wilkins, Butler, Northampton.
Woodburn, William Desbrisay, Glasgow.

MEETING OF EXAMINERS.—A Meeting of the Court of Examiners is fixed for Thursday, January 17th. Gentlemen desirous of receiving the Certificate of the College by Examination are requested to communicate with Mr Hulme, the Registrar, who will forward the necessary particulars.

LECTURES AT THE COLLEGE.—On Tuesday evening, January the 8th, Mr Hulme, M.R.C.S., F.L.S., will deliver the First of a Course of Lectures on "Diseases of the Dental Periosteum," to commence at Eight o'clock precisely, and to be continued on the evenings of Tuesday, January 29th, and February 12th, at the same hour.

ANNUAL GENERAL MEETING.—The Annual General Meeting of Members will be held on Tuesday, January the 22nd, 1861, at Seven p.m., to receive the Report of the Council, to elect Officers for the ensuing year, and to transact the general business of the College.

REVIEWS AND NOTICES OF BOOKS.

OBSERVATIONS ON STOPPING TEETH, as a Means of preventing their Loss and averting the more Serious and Painful Operations. By SYDNEY LONGHURST, Dental Surgeon.

WE have here a pamphlet of some twenty pages, professedly upon stopping teeth; but, after carefully perusing it, we find nothing but the most commonplace generalities, such as might have been written by a first-year's pupil: we are therefore driven to the conclusion that the real object of the letterpress was to bear the heavy burthen of the writer's name on the title-page.

We have yet to learn that "the public have been hitherto led to regard the Dentist as one who merely extracts and makes artificial teeth." We have hitherto supposed that this operation was confined to the natural organs. Considering the great attention which has been paid of late years to the best means of stopping and preserving teeth, it is too bad to find a writer libelling his fellow-practitioners by informing the public that "the Dentist has been too prone to neglect the most important branch of his art, the preservation of the teeth; and that, as little practice produces little skill, so little skill entails little practice: that when a tooth has been stopped, it is frequently so indifferently done as to be wholly ineffectual and delusive."

The pamphlet passes through all the phases of a regular Adelphi drama. It commences with a picture of oral happiness, arising from the possession of a perfect denture. Then comes the villain of the piece, in the shape of caries, which "removes stone after stone from the fair structure, till the stalwart man of thirty in a few years is transformed into the prematurely wrinkled, dyspeptic, mumbling old man." Of course, the good genius of the piece is the writer of the book, who, in the form of the Reputable Dentist, removes every portion of softened bone, shapes the cavity to the necessary form to receive and retain the gold, smooths and makes circular the orifice, and proceeds to introduce the gold, every part of which is properly consolidated or welded before subsequent portions are added, and who, lastly, files down and burnishes the whole. The piece concludes with a *tableau*, which introduces the Reputable Dentist as a restorer of artificial teeth, and as one who sifts and estimates the intrinsic worth of every invention or novelty put forth bearing the semblance of value, and applying its peculiar excellences to the peculiarities of each case.

The time was when such pamphlets as the present might have been allowed to pass without comment; but when the Members of the Dental Profession are unanimous in condemning the system of newspaper advertisements, it is desirable that those who hold an honourable position in that Profession should abstain from introducing themselves to the notice of the public by the publication of such useless and unmeaning pamphlets as the present. If the work had contained even the slightest account of caries and the actual method of stopping teeth, we should not have felt called upon to make these remarks.

THE 'DENTIST'S HANDY-BOOK AND APPOINTMENTS' REGISTER FOR 1861.' London: H. Baillière, 219 Regent street, W.

The 'Dentist's Handy-book' is a first attempt to put into a convenient shape a daily register of events for the practising Dentist. The book contains a variety of useful information, and an excellent summary of Dental literature. To those who are interested in the progress of our Societies at home and abroad, and of Dental Colleges and Schools, English and American, this book is a necessity. The body of the work consists of a well-arranged Diary, adapted for noting down Professional engagements. The Editor of the 'Dentist's Handy-book' intimates that he will be happy to receive any suggestions for the improvement of future editions. This gives us the hope that the Editor will obtain sufficient encouragement to go on year by year from this date; an encouragement which he most strictly deserves, for a book more carefully conducted, more free from party bias, and more useful in its intentions, we have never seen. It should find a place in the consulting-room of every Dental Practitioner.

CORRESPONDENCE.

TO THE EDITOR OF THE 'DENTAL REVIEW.'

SIR,—I have been reading with great interest Dr Richardson's Lectures on Anæsthetics, &c., and I consider the Profession much indebted to you for publishing them in the pages of the REVIEW. In the sixth lecture, however (p. 597 of the number for this month), there is a curious explanation of the phenomena of cardiac syncope from the inhalation of chloroform, which seems to me so completely erroneous that I fancy the lecturer's words must have been misreported. Dr Richardson is represented as stating that it is the *right* or venous side of the heart which is primarily paralysed: on what grounds he makes this assertion I am at a loss to imagine. We may suppose that a certain portion of the chloroform vapour is absorbed by the capillaries of the nasal and buccal mucous membrane, possibly also by those of the *bronchial* veins, and thus find its way into the right side of the heart; but this sinks into insignificance when compared with that which must be absorbed by the *pulmonic* capillaries, and conveyed in the oxygenised blood by the pulmonary veins to the *left* side of the heart, whence it is at once circulated through the body, producing its peculiar effects on the nervous centres, &c., or where it would, in cases of cardiac syncope, exert its direct paralysing influence. It is evident that nearly the whole of the inhaled chloroform must pass through the left side of the heart and the entire systemic circulation before it can reach the right side of the heart at all.

I have the honour to be, Sir, your obedient servant,

Bridgwater, Dec. 18, 1860. HENRY LONG JACOB, M.R.C.S.

[We have submitted the question of our esteemed correspondent, Mr Jacob, to Dr Richardson, who, in reply, states the report given by Mr Driscoll is strictly correct. Dr Richardson explains that the effect of chloroform on the heart is not by the direct contact of the vapour with the endocardial surface of the heart, but by the conveyance of the narcotic through the coronary vessels into the actual structure of the organ. In this way, all parts of the organ are paralysed, but the right side is always paralysed first; hence also the right side is distended with blood, and is rendered unable to drive on the pulmonic current.—ED. DENTAL REVIEW.]

MISCELLANEOUS.

Atrasia Oris.—Many cases of the disease atrasia oris, or closure of the mouth, present themselves to the notice of those attending the medical charities of Calcutta. It would appear that there are two forms of this disease : one in which the mucous membrane covering the front of the ramus of the lower jaw has been inflamed, and subsequently contracting, causes closure of the teeth, without narrowing, to any considerable degree, the opening of the lips. If the history of these cases be traced, it will be found that they have generally resulted from the cutting of the last molar or wisdom tooth having caused the gum to inflame. The other kind of closure of the mouth results from the indiscriminate and excessive use of mercury by native practitioners. The ulceration of the mucous membrane lining the gums and cheeks succeeds to the ptyalism so produced, and, on the inflammation subsiding, the opposed ulcerated surfaces unite and cause the jaws to be closed, and the opening of the mouth to be contracted. Both Dr Fayrer and Dr Partridge are accustomed to remedy the first accident in the same manner, by dividing the firm contracted band of mucous membrane with a knife (one of the tenotomy knives is generally found to be most convenient), and then forcing open the jaw by an extending trivalve speculum. With a little attention to dressing, this plan generally succeeds. In the other species of atrasia oris a similar plan was at first adopted. The adhesions were divided by a narrow knife, the jaws forced open by the speculum if necessary, and lint dipped in oil was pushed in to separate the recently-cut surfaces. But the disease treated by this way alone had so great a tendency to relapse, that in the recent case, Dr Fayrer, in addition to the above, divided the skin at the angles of the mouth in a direction downwards and outwards ; and though at first this occasioned a most lachrymose expression to the man's countenance, it ultimately perfectly succeeded, and he left the hospital cured.—'Indian Lancet.'

Cementation of Iron.—The process by which iron is converted into steel generally consists in making it combine with a small quantity of carbon ; and very frequently, owing to the brittleness of steel when tempered to the highest degree, it is desirable to give the qualities of steel to the surface only of a bar of iron. This is done by enclosing it in a box of sheet-iron, filled with charcoal-dust or horn-shavings, tallow, &c. Here the question naturally arises, whether carbon combines with the metal under a solid form, which is scarcely admissible, or else is absorbed in the shape of some carburetted gas ; and in the latter case, it is useful to know what gas is generated in the process. On this subject M. Caron has just addressed a paper to the Academy of Sciences, in which he describes several experiments of his to show that the cementation is owing to the formation of a cyanide, cyanogen being, it is well known, a compound of carbon and nitrogen. Having filled a porcelain tube with fragments of charcoal surrounding a bar of iron, and exposed it to the heat of a reverberatory furnace, he successively caused hydrogen, oxide of carbon, azote, air, pure carburetted hydrogen, &c., to pass through the tube, but could not after a two hours' fire obtain any degree of cementation. But the case was far different when he made a current of dry ammonia pass through the tube ; in that case the cementation was effected rapidly and easily ; after being exposed to the fire for two hours, the bar of iron being immediately tempered, then hammered to make the grain closer, and then tempered once more, proved, on being broken, to have been cemented to a depth of two millimetres. This result M. Caron attributed to the formation of the cyanide of ammonium, and further experiments confirmed this idea. M. Caron then, in order to obtain cyanide of potassium in his tube as a cementing agent, let his charcoal soak in a solution of carbonate of potash, and the experiment succeeded beyond expectation. In the same manner he obtained excellent cementations by employing soda, barytes, and strontian, under the influence of a current of air. Hence, he shows that all the various nostrums used in metallurgy for cementing iron owe their efficacy to the formation of cyanides.

ARREST OF DEVELOPMENT IN THE INFERIOR MAXILLARY BONE.—At a recent meeting of the Pathological Society of London, Mr Canton related an interesting case which occurred in a girl, aged sixteen. The development had ceased at the inferior dental foramen; the upper half of the perpendicular ramus was consequently wanting. Associated with this deformity was an absence of the bony portion of the auditory meatus, the glenoid cavity, and the zygomatic process of the temporal bone. The external ear was small, misshapen, and placed considerably in advance of its normal position. The corresponding side of the lower half of the face was much flattened, and the chin receded so as to give the countenance somewhat of an idiotic expression. Mr Canton thought the preparation interesting, as corroborating the views of Kölliker and Tomes with respect to the development of the perpendicular ramus of the lower jaw, and which they state to proceed downwards to the body of the bone from the articular cartilage; in this instance the latter was unformed, and there resulted, consequently, a want of development of that part which should grow from it.

STAPHYLORAPHY.—This operation was performed by Mr Fergusson, on December 16, at King's College Hospital. The patient, a young girl of ten years of age, was submitted, although so young, to the operation for cure of cleft palate. The difficulties were necessarily great in consequence of her youth, but were completely overcome by the great patience practised by Mr Fergusson during the operation, which was of a trying and tedious character. The opposition of the girl and her resistance at every step were painful to witness, reminding one of the olden time when chloroform was not known. Mr Fergusson remarked that staphyloraphy is almost the only operation of surgery in which you cannot resort to the influence of chloroform. In the performance of this operation for cleft palate, Mr Fergusson said, you want the consent of the patient for the accomplishment of your object at every stage. You must have his free will, and the patient must be possessed of complete volition. In short, *you* operate, and by his willingness *he* assists. You otherwise cannot make him open his mouth by any mode, not even by force. You then have to obtain the proper position by which light may be admitted and reflected at a suitable angle for your purpose. Your own manipulations, Mr Fergusson said, also intervene and intercept vision of the parts to be operated upon. These are trials of patience and temper, since *anæsthetics* are impossible. In enlarged tonsils, where you have to make only one section, they (chloroform, for instance) can be resorted to. The section made, the whole process is concluded. In this case we have had resistance from beginning to end. At best, this operation seems a boggling, stitching, and cobbling piece of business. Fortunately, this was a very favourable case, the soft parts being only cleft, the hard palate not being implicated. The operation was consequently simple and comparatively facile. After the usual and necessary division of the *levatores palati* muscle, and paring edges of the fissure with a straight blunt-pointed bistoury, thus removing only the mucous membrane, the anterior and posterior pillars of the fauces, if necessary, are divided with blunt-pointed scissors about a fourth of an inch. The operation is concluded by insertion of sutures with the *retroverted* hooked needle which we described last week in reporting a similar operation. Notwithstanding the continuous resistance of the patient throughout, the edges were nicely and accurately approximated, giving promise of a good and satisfactory cure.—'Medical Circular.'

TOOTHPICKS.—The 'Amer. Med. Times' gives the following sketch of the manufacture of and trade in toothpicks: "Where do the toothpicks come from? It is supposed that the Yankee, when he first felt the necessity of cutting a stick of timber in order to provide himself with a toothpick, gained the knowledge of whittling, and has since kept and improved upon the lesson. A New Englander will produce a toothpick with his knife from almost everything except a bar of iron, but with all his inventive genius it has remained for the natives of Chili to supply this toothpicking nation with a large proportion of the instruments for gratifying their habit or necessity. The aged and decrepit and the young of both sexes of Chili are engaged in preparing those little orange sticks that one finds at every restaurant and hotel in the city and country. These they whittle out with astonishing rapidity, at the rate of five or six hundred in an hour. The sticks are then packed in bundles of a thousand each, and sent to this city; being imported expressly by a lady in Division street, whose son superintends their manufacture in Chili. Here the toothpicks are sold for twenty cents a thousand, and scattered all over the country—placed in the restaurants and hotels, and in the hands of every toothpicking Yankee in the republic. To such an extent is this traffic carried, that the proprietors of the Astor House alone purchase eight or ten barrels of every importation, and retail them among the country hotels. A restaurant with a good run of custom will consume about twenty thousand toothpicks in three weeks."

POISONING OF THENARD BY CORROSIVE SUBLIMATE.—M. Flourens read an interesting *Eloge* on Thenard, before the Academy of Sciences, January 30, 1860. We find in it the following account of the *sang-froid* of Thenard, when he had accidentally taken a large quantity of corrosive sublimate, and of the excitement incident to the occasion:—"During a lecture at the Polytechnic School, it happened, one day, that something necessary for the demonstration was wanting. Thenard called for it impatiently, and while the assistant ran with all his might to procure it, the Professor, by way of passing the time, put his hand on a tumbler and raised it to his lips without examination. Having taken two swallows, he placed it on the table. 'Gentlemen,' he said with *sang-froid*, 'I have poisoned myself.' An electric shock was immediately felt, and the faces of all became pale. Thenard stated that it was corrosive sublimate which he had swallowed, adding, 'White of egg will combat its effects: will some one get me some eggs?' Scarcely had this sentence escaped him, when the doors and windows were not wide enough—they ran, they pitched headlong; the storehouses are forced open, the kitchens likewise—but no eggs: the neighbourhood, being put under contribution, was soon pillaged; each brought his share, and a mountain of eggs was reared. In the mean time a student flew to the Faculty of Medicine. Interrupting an examination, he cried: 'A doctor! Thenard has poisoned himself in the school while delivering his lecture.' Dupuytren arose. 'Do you understand?' he said, and ran out; a cabriolet is in the way—he mounts—whips the horses—arrives—leaps to the ground. However, thanks to the albumen, Thenard was already saved; but

Dupuytren required the assistance of the pump, so as to be sure that the stomach might not absorb any corrosive substance. The organ becomes inflamed, and, safe from the poison, Thenard is put in danger by the remedy. Thenard was carried home. There, all the doors were guarded; the students of all the schools united to surround the house with triple ramparts; advance sentinels were detached to keep off the troublesome; silent and mournful all awaited the news transmitted from within, where the most fitted were scarcely able to restrain their zeal: in the sincerity of their affection, they envied the privileges of the family. Day and night watch was kept without intermission, without fatigue, for this man, who swayed the whole realm of kindness, was the property of the youth, and they wished to save him. Every morning accurate bulletins were affixed on all the large establishments; no one knew their authors. When Thenard reappeared in his chair at the Sorbonne, the excitement was so great that every one ran out without knowing precisely what he was doing; the Professor himself declared that he had no power of controlling his deep emotion."—L. H. S., in 'Amer. Med. Monthly.'

NEURALGIA WITH DEAFNESS, CURED INSTANTANEOUSLY BY THE EXTRACTION OF A TOOTH.—M. Ed. Vautier records ('Gaz. des Hôpit.,' June 14, 1860) a case of this. The subject of it was a very nervous, slender woman, who had suffered for about four months with intense neuralgic pains, radiating through almost all the teeth, and also the muscles of the anterior region of the left side of the head. There was constant lachrymation of the left eye, and from the moment of the attack complete deafness in the ear of the same side. A number of physicians had been consulted, and sulphate of quinia, flying blisters, and atropia, in succession, tried without giving relief. When seen by Dr B. she was suffering severely; had long been deprived of sleep, and could not chew her food. The teeth were examined with care, but no one could be found carious. The wisdom tooth on the left side seemed, however, slightly painful on being touched, and loose. She was advised to have this tooth extracted, but with some temper refused. However, some days afterwards, her physician again advising it, she consented, and the tooth was extracted by M. Vautier. The pains at once ceased, and her hearing was restored.

SOMETHING NEW ABOUT GOLD.—At a late meeting of the Manchester Geological Society, an interesting paper was read by T. A. Readwin, Esq., on gold discoveries which had been made by him in Merionethshire, Wales, and he exhibited numerous rich specimens of ore taken from it. He stated that Sir R. Murchison had laid it down that "the most usual position of gold is in veinstones that traverse altered paleozoic slates, frequently near their junction with eruptive rocks, whether of igneous or aqueous origin." This statement was remarkably corroborated by the position of the quartzoze vein in Wales, which traversed altered paleozoic slates, near the junction of an eruptive bar of porphyritic greenstone. The same law was found to hold good in all the gold-bearing quartzoze veins of Wales. Several shoots aud bunches of gold were found in one mine. In one instance, 100 pounds of goldstone yielded 14¼ ounces of fine gold. Lately, operations were commenced to mine the quartz upon what is called 'St David's lode.' Of the rock which had been raised and broken, many stones were found very rich in gold and sulphides of copper, and there was another mineral, which had been termed *white metal*, that had been examined by several mineralogists, none of whom knew what it was, an ignorance which was shared in by the Members of the Association after much examination. Cubes of this white metal were found in cubes of gold, and *vice versâ;* and wherever it was found, it was a sure indication that gold was there also. Mr Readwin, in his paper, asserted that at a certain temperature gold would volatilize and escape mechanically, though such was not the general belief. Mr Atkinson, a member, stated that gold was sublimated from the earth by internal heat.

NOTICES TO READERS AND CORRESPONDENTS.

All communications intended for insertion in this Journal must be authenticated by the name and address of the writer, not necessarily for publication, but as a guarantee of good faith.

Contributors are requested to be so obliging as to write legibly, and on one side of the paper only.

All Communications intended for insertion, as well as Books for Review, &c., should be addressed to "The Editor," at the Publisher's, Mr H. BAILLIERE, 219 Regent street, W., NOT LATER THAN THE 15TH OF THE CURRENT MONTH.

In our next number will appear the first of a Course of Lectures on "Dentition and its Derangements," delivered by A. JACOBI, M.D., Professor of Infantile Pathology and Therapeutics at the New York Medical College; reprinted from the 'American Medical Times.'

MR R. THOMSON.—We shall be glad to hear from you as soon as your professional engagements will permit.

A. D. is thanked for his suggestion; but he will perceive that he has already been anticipated by the present arrangements for the REVIEW.

H. WILSON.—Mr Tomes' Lectures on Dental Surgery are better adapted for the Student than his recently-published Manual.

A FOURTH-YEAR'S PUPIL.—You are eligible for Membership of the College of Dentists by Examination. The Laws of the College require that Candidates shall have been engaged in the practice of Dentistry for a period of not less than three years. We should advise you to complete your studies by attending a Course of Lectures at the Metropolitan School of Dental Science previous to presenting yourself for examination. Mr Kempton, 8 Princes street, Hanover square, is the Hon. Secretary to the School.

MR A. CANTON.—Journal received; acknowledged with thanks.

BOOKS RECEIVED FOR REVIEW.

A Practical Treatise on Mechanical Dentistry. By Joseph Richardson, D.D.S., Professor of Mechanical Dentistry in the Ohio College of Dental Surgery. Pp. 427. London: Trübner and Co.

Observations on Stopping Teeth. By Sydney Longhurst, Dental Surgeon. London: H. Baillière.

Introductory Address, delivered in the Pennsylvania College of Dental Surgery. By W. Calvert, D.D.S., Professor of Mechanical Dentistry.

IN EXCHANGE.

The American Journal of Dental Science (Quarterly) for October.
The Dental Cosmos for November and December.
The Dental Register of the West for November and December.
The New York Dental Journal (Quarterly) for October.
The London Medical Review for November and December.
The American Medical Times, Nos. 8 to 23.

THE

DENTAL REVIEW.

FEBRUARY, 1861.

THE NATURAL HISTORY OF THE HUMAN TEETH.

BY JOHN HUNTER, F.R.S.

EDITED BY

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(Continued from page 11.)

OF THE MOTION IN THE JOINT OF THE LOWER-JAW.

The Lower-Jaw, from the manner of its articulation, is susceptible of a great many motions. (*w*) The whole Jaw may be brought horizontally forwards, by the Condyles sliding from the cavity towards the eminences on each side. This motion is performed chiefly when the Teeth of the Lower-Jaw are brought directly under those of the Upper, in order to bite, or hold any thing very fast between them.

(*w*) [The form of the osseous surfaces entering into the temporo-maxillary articulation, and the varieties of motion which it admits, are so variously modified to suit the functions and necessities of the different families of Mammalia, that there is no portion of the skeleton calculated to yield more certain information to the naturalist. In the frugivorous Quadrumana the articulation is loose, as in Man, and permits within certain limits of each kind of movement—viz., in the vertical, the antero-posterior, and lateral directions. The principal differences between bimanous and quadrumanous structure in this joint are the somewhat greater flatness of the glenoid surface, the minor development of the anterior articular eminence, and the constancy and size of the post-glenoid ridge in the latter. In the Carnivora the condyle of the lower jaw is an oblong cylindroid process of considerable length, placed transversely, almost, if not quite, in a straight line with its fellow of the opposite side. The receiving surface is bounded anteriorly and posteriorly by salient ridges, which increase its depth, and limit the chief motion of the joint to the vertical direction, permitting only in addition a slight lateral gliding of the condyles. The

Or, the Condyles only may be brought forwards, while the rest of the Jaw is tilted backwards, as in the case when the Mouth is open; for on that occasion the angle of the Jaw is tilted backwards, and the chin moves downwards, and a little backwards also. In this last motion, the Condyle turns its face a little forwards; and the center of motion lies a little below the Condyle, in the line between it and the angle of the Jaw. By such an advancement of the Condyles forwards, together with the rotation mentioned, the aperture of the Mouth may be considerably enlarged; a circumstance necessary on many obvious occasions.

The Condyles may also slide alternately backwards and forwards, from the cavity to the eminence, and *vice versa;* so that while one Condyle advances, the other moves backwards, turning the body of the Jaw from side to side, and thus grinding, between the Teeth, the morsel separated from the larger mass by the motion first described. (*x*) In this case, the center of motion lies exactly in the middle between the two Condyles. And it is to be observed, that in these slidings of the Condyles forwards

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development of the anterior ridge varies in different species. In the badger both processes project in such a manner as almost to embrace the condyle, so that in the skeleton the lower jaw is retained *in situ* without any artificial fastening. In the placental Rodents, on the other hand, the long diameter of the condyle is antero-posterior, and the cavity is a groove limited by internal and external ridges. In accordance with this conformation, the conspicuous movement of the lower jaw in the Rodents is in the antero-posterior direction. The "nibbling" motion allowed is in exact accordance with the structure of their teeth and the disposition of the muscles of mastication. In the Ruminantia, again, we find both glenoid cavity and condyle almost flat, and the anterior limitation by the transverse root of the zygoma is scarcely discernible. Such a joint is admirably adapted for an extensive lateral movement of the jaw in chewing the cud, whilst the power of gaping is proportionately limited. (1)]

(*x*) [In a paper read before the Royal Society of Edinburgh, Dr John Smith has advanced the following theory of the mechanism of the Temporo-Maxillary Joint. He considers that in the movement of simply opening and shutting the mouth, "the condyles cannot act as a *simple hinge*, as they lie, not at right angles to the plane of motion of the lower jaw, but obliquely to it, each condyle looking inwards and forwards. Their more perfect action, therefore, cannot occur in this movement, but seems to belong to that of mastication. The articulating surface, strictly speaking, on each condyle appears to constitute the and backwards, the moveable cartilages do not accompany the Condyles in the whole extent of their motion; but only so far as to adapt their surfaces to the different inequalities of the Temporal Bone: for as these cartilages are hollow on their lower surfaces where they receive the Condyle, and on their opposite upper surfaces are convex where they lie in the cavity; but forwards, at the root of the eminence, that upper surface is a little hollowed; if they accompanied the Condyles through the whole extent of their motion, the eminences would be applied to the eminences, the cavities would not be filled up, and the whole articulation would be rendered very insecure.

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(1) *Vide* Cuvier, Leçons d'Anatomie Comparée, Tome iv., P. 1, p. 36, edit. 1835; Todd's Cyclopædia of Anatomy, Article Temporo-Maxillary Articulation.

This account of the motion of the Lower-Jaw, and its cartilages, clearly demonstrates the principal use of these cartilages; namely, the security of the articulation; the surfaces of the cartilage accommodating themselves to the different inequalities, in the various and free motions of this joint. This cartilage is also very serviceable for preventing the parts from being hurt by the friction; a circumstance necessary to be guarded against, where there is so much motion. Accordingly, I find this car-

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thread, or rather part of the thread, of a conical screw passing over an axis lying at or about right angles to the plane of motion in simple opening and closing of the jaws. This spiral course of the articular surface is perhaps best seen in some of the large *Carnivora*, such as the lion, but is also obvious in a well-developed human condyle.

"The action of this conical screw or tap within the glenoid cavity, considered as the conical die, takes place with accuracy only when one joint alone acts with the condyle within the glenoid cavity—the other condyle being beyond it, and gliding on the surface of the zygoma, as during mastication. The food is in this process crushed between the molar teeth of that side whose condyle remains within the glenoid cavity, this condyle screwing the jaw back, so to speak, to its natural position at each closure of the teeth.

"By this construction a great amount of friction is avoided; what would otherwise be a *rubbing* being thus converted into a *rolling* motion between the condyle and glenoid surfaces; while, by one or other condyle always remaining in the glenoid cavity during mastication, greater steadiness and security is afforded to the joint."(1)

It need scarcely be remarked here, that however the above explanation may be applicable to the movements of the condyle in the human subject, it cannot be extended to the motion of the joint in the large Carnivora; in which animals, nevertheless, a spiral direction of the articular surface is well seen. This spiral appearance of the articular surface in the *Felidæ* is clearly dependant on the disposition of the anterior and posterior articular processes, the post-glenoid being most developed internally, whilst the anterior ridge is necessarily more external to permit the play of the contiguous coronoid process.]

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(1) Edinb. Philosoph. Journal, N.S., vol. viii., p. 150.

tilage in the different tribes of Carnivorous Animals, where there is no eminence and cavity, nor other apparatus for grinding; and where the motion is of the true ginglimus kind only.

In the Lower-Jaw, as in all the joints of the body, when the motion is carried to its greatest extent, in any direction, the muscles and ligaments are strained, and the person made uneasy. The state, therefore, into which every joint most naturally falls, especially when we are asleep, is nearly in the middle, between the extremes of motion; by which means all the muscles and ligaments are equally relaxed. Thence it is, that commonly, and naturally, the Teeth of the two Jaws are not in contact; nor are the Condyles of the Lower-Jaw so far back in the Temporal Cavities as they can go.

OF THE MUSCLES OF THE LOWER-JAW.

Having described the figure, Articulation, Motion, and use of the Lower-Jaw, it will be necessary, in the next place, to give some account of the Muscles that are the causes of its motion.

There are five pair of Muscles, each of them capable of producing various motions, according to the situation of the Lower-Jaw, whether they act singly, or in conjunction with others; and two or more of them may be so situated, as to be capable of moving the Jaw in the same direction; and every motion is produced by the action of more than one Muscle at a time. Thus, if the Jaw is depressed, and brought to one side, either the Masseter, Temporal, or Pterigoidæus internus of the opposite side will not only raise the Jaw, but bring it to its middle state. It will be necessary in the description of each Muscle, to give its use in the different situations of the Jaw; by which means, after they are all described, their compound actions will be better understood. I shall first describe those which raise the Jaw; then those which give it the lateral motion; and lastly, those which depress it; proceeding in each class as they rise in dissection.

The most superficial is the Masseter: it is situated upon the posterior and lower part of the Face, between the cheek-bone, and angle of the Lower-Jaw, directly before the lower part of the Ear. It is a thick, short, complex Muscle, and a little flattened: it appears to have two distinct origins, an anterior outer, and a posterior inner; but that is owing only to its outer edge at its origin being slit, or double; and the fibres of these two edges having a different course, decussating each other a little. The anterior, and outer portion of the Muscle begins to rise from a small part of the lower edge of the Malar Process of the Maxillary Bone, adjoining to the Os Malæ; and continues its origin all along the lower horizontal edge of this last bone, to the angle where its Zygomatic Process turns up, to join that of the Temporal Bone. The external layer of fibres in this portion are tendinous at their beginnings, while the internal are fleshy.

The posterior and inner portion of this Muscle begins to rise partly tendinous, and partly fleshy, from the same lower edge of the Os Malæ; not where the origin of the other portion terminates, but a little farther forwards; and this origin is continued along the lower edge of the Zygomatic Process of the Temporal Bone, as far backwards as the eminence belonging to the articulation of the Lower-Jaw.

From this extent of its origin, the Muscle passes downwards to its insertion into the Lower-Jaw. The anterior external portion is broader at its insertion than at its origin; for it occupies a triangular space of the Lower-Jaw above the angle, and on the outside, of about an inch in size, to about an inch and a half from the angle towards the Chin. In consequence of this extent of insertion, the fibres of this portion divaricate very considerably. They are mostly fleshy at their insertion, a few only being tendinous, particularly those that are inserted backwards. The posterior and inner portion of the Masseter is narrower at its insertion than at its origin; its posterior fibres running forwards, as well as downwards, while its anterior run almost directly downwards. It occupies in its insertion the remaining part of the scabrous surface, above the angle of the Lower-Jaw, which lies between the anterior portion and the two upper processes, viz., the Condyle and Coronoide. As the anterior fibres of this portion rise on the inside of the posterior fibres of the other portion; and as its posterior fibres run forwards as well as downwards, and its anterior run almost directly downwards, while the fibres of the other portion radiate both forwards and backwards; these two portions in some measure decussate, or cross one another. The anterior fibres, which run farthest and lowest down, are tendinous at their insertion, while the posterior and shortest are fleshy.

The use of the whole Muscle is to raise the Lower-Jaw; and when it is brought forwards, the posterior and inner portion will assist in bringing it a little back; so that this Muscle becomes a rotator, if the Jaw happens to be turned to the opposite side.

We may observe, that this Muscle is intermixed with a number of tendinous portions, both at its origin and its insertion; which give rise to a greater number of fleshy fibres, and thereby add to the strength of the Muscle. (*y*)

(*y*) [The masseter muscle exists in all the inferior Mammalia. It may be said generally to vary in size and strength with the amount of resistance it is destined to overcome in the act of mastication. In those animals, also, in which the other elevators of the jaw, especially the temporal, are of small size, the masseter takes on increased development and power (*e. g.*, Rodentia, Ruminantia). The size, strength, and shape of the zygomatic bar, together with the condition of the angle and postero-external surface of the inferior maxilla, may be taken as indices of the development and powers of this muscle. In the typical Carnivora, the zygomatic arch is of very great strength and depth; below it is formed almost entirely by the malar bone, above by the temporal, so that the suture between them extends obliquely nearly the whole length of the arch. It is arched upwards as well as outwards, the upper margin being convex, the lower concave, and the latter is deeply excavated for the attachment of the muscle. It is to be observed that the more purely carnivorous the animal, the greater is the convexity of the vertical arch described by the zygoma. The short and very thick masseter arising from the vaulted arch above passes downwards, backwards, and inwards, to be inserted into the posterior part of the lower border of the jaw, and into the lower portion and inferior boundary of the deep fossa which occupies its external surface behind the great molar tooth (*carnassière*), whilst the most external of the fibres turn round the inferior margin of the bone, to be fixed in a tendinous *raphê* common to it and the external pterygoid. (1) The postero-internal portion of the muscle which rises in front of the glenoid cavity has a direction downwards and forwards, and is inserted into the external excavated surface of the coronoid. In the Carnivora, the masseter is at its maximum of development and power as an elevator of the lower jaw. With them we may compare another order—Rodentia—in which this muscle has another purpose to fulfil besides that of raising the jaw—viz., the production of that motion from behind forwards for which we have already seen the articular surfaces of the condyle and glenoid cavity are specially adapted. In the Rodents, the lower border of the zygoma is convex, the curve of the vertical arch being always in the opposite direction to that which is constant in the Carnivora; in some species—*e. g.*, the capybara, the agoutis, and pacas—the convexity of the arch descends to a level below that of the superior grinders. The superior maxillary bone contributes also to its formation, the malar being frequently, as it were, suspended between its apophysis and the zygomatic process of the temporal bone. In these animals the masseter is of great strength when compared with the temporal, and it is divided into several distinct portions, which in some species may rank as separate muscles. A large portion of the muscle will be found to arise from the superior maxillary and fore part of the arch, and to pass obliquely backwards, its action being to bring the jaw directly forwards. In many instances a muscular fasciculus commences by a strong tendon under the sub-orbital foramen, and passes nearly directly backwards; in the agouti this portion of the

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(1) *Vide* Straus-Durckheim, Anatomie du Chat, T. ii., p. 217.

TEMPORALIS.

It is situated on the side of the Head, above, and somewhat before the Ear. It is a pretty broad, flat, and radiated Muscle; broad and thin at its origin; narrow and thick at its insertion; and is covered with a pretty strong Fascia, above the Jugum.

This Fascia is fixed to the bones round the whole circumference of the origin of the Muscle. Above, it is fixed to a smooth white line, that is observable upon the Skull, extending from a little ridge on the lateral part of the Os Frontis, continued across the Parietal Bone, and making a turn towards the Mammillary Process. It is fixed below, to the ridge where the Zygomatic Process begins, just above the Meatus Auditorius; then to the upper edge of the Zygomatic Process itself, and anteriorly to the Os Malæ. This adhesion, anteriorly, above, and posteriorly, gives, as it were, the circumference of the origin of the Temporal Muscle.

This Muscle arises from all the bones of the side of the Head, that are within the line, for insertion of the tendinous Fascia, viz., from the lower and lateral part of the Parietal Bone, from all the squammous portion of the Temporal Bone, from the lower and lateral part of the Os Frontis, from all the Temporal Process of the Os Sphenoides, and often from a process at the lower part of this surface, (which portion, however, is often common to this Muscle, and the Pterygoidæus externus) and from the posterior surface of the Os Malæ. Outwardly, it rises from the inner surface of the Jugum, and from the whole inner surface of the Fascia above described. At this origin, from the Jugum it is not to be distinguished from the Masseter,

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masseter covers the posterior half of the jaw, and terminates on the internal surface of its posterior border. Other fibres have a more perpendicular arrangement, and in some species—*e. g.*, the rabbits—the fibres of a small portion of the muscle will be found to run in the opposite direction to the larger mass. They assist in moving the jaw upwards and backwards. (1)

In Man and the Quadrumana, the zygomatic bar is nearly transverse. In the latter it is of greater length, in conformity with the relative dimensions of the cranium and face; it is also somewhat more curved, the upper border being slightly convex behind and concave in front. In the greater Anthropoid Apes (*Tr. Gorilla and Pith. Satyrus*) the massive dimensions of the zygoma, dependant on the great size of the lower jaw and the development of the canine teeth, present a striking contrast with the human configuration. (2)]

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(1) *Vide* Cuvier, Leçons d'Anatomie Comparée, T. iv., partie 1, leçon xvi., edit. 1835.

(2) *Vide* Owen, Zool. Trans.

being there, in fact, one and the same Muscle; and indeed the Masseter is no more than a continuation of the same origin, under the edge of the Jugum; and might properly enough be reckoned the same, both as to its origin and insertion, and in some measure in its use also.

The origin is principally fleshy; and the Muscle passes from it, in general, downwards, and a little forwards, converging, and forming a thin middle tendon. After which the Muscle runs downwards, on the inside of the Jugum, and is inserted into the Coronoide Process of the Lower-Jaw, on both sides tendinous and fleshy, but principally tendinous. It reaches farther down upon the inside of the Coronoide Process, than upon the outer side, where the insertion is continued as low as the body of the bone.

The posterior and inferior edge of this Muscle passes over the root of the Zygomatic Process of the Temporal Bone, as over a pulley, which confines the action of the Muscle to that of raising the Lower-Jaw, more than if its fibres had passed in a direct course from their origin to their insertion.

The use of the Temporal Muscle, in general, is to raise the Lower-Jaw; and as it passes a little forwards to its insertion, it must bring the Condyle at the same time backwards, and so counteract the Pterygoidæus externus of the opposite side; and if both Muscles act, they counteract both the Pterygoidæi, by bringing back the whole of the Jaw. (*z*)

(*z*) [The size and development of the temporal muscle (crotaphite) is indexed by the extent and depth of the temporal fossa, the outward or horizontal curve described by the zygoma, together with the height and the excavations on the internal and external surfaces of the coronoid process. As the powerful elevator of the lower jaw, it is *par excellence* the biting muscle; and it may be generally stated that its dimensions and force will be found closely related to the development of the piercing and cutting teeth, especially the canines. In those of the inferior Mammalia in which this muscle attains considerable size, it is common to find the depth of the fossa from which it arises increased by the production of its boundaries in the form of osseous ridges or *cristæ*, which spring from the surfaces of the frontal, the parietal, and the occipital bones. The direct relation which exists between the development of the temporal and the condition of the dental apparatus is well illustrated by a comparison of the male and female and immature and adult crania of the large Anthropoid Quadrumana. Amongst these the maximum of extension and depth of the temporal fossa is to be seen in the skull of the adult male Gorilla, where a lofty sagittal crest is produced by the union of the frontal ridges at the coronal suture, and behind is continued into two thick salient occipital cristæ. The same thing is repeated, although in a somewhat inferior degree, in some skulls of the adult male Orang (*Pith. Satyrus*). In other specimens of this species, the parietal ridges, although considerably developed, are not blended

PTERYGOIDÆUS INTERNUS. *(a)*

It is situated upon the inside of the Lower-Jaw, opposite to the Masseter, which is upon the outside. It is a strong short Muscle, a little flattened, especially at its insertion. It arises tendinous and fleshy from the whole internal surface of the external Ala of the Sphenoid Bone; from the external surface of the internal Ala, near its bottom; from that process of the Os Palati that makes part of the Fossa Pterygoidæa; likewise from the anterior rounded surface of that process, where it is connected to the Os Maxillare superius. From thence the Muscle passes downwards, a little outwards and backwards, and is inserted tendinous and fleshy into the inside of the Lower-Jaw, from the angle, up almost to the groove for the admission of the Maxillary Nerve, where the surface of the bone is remarkably scabrous.

The Use of this Muscle is to raise the Lower-Jaw; and from its direction, one would suspect that it would bring the Condyle a little forwards; but this motion is contrary to that of the Lower-Jaw, for it is naturally brought back when raised.

PTERYGOIDÆUS EXTERNUS, *(a)*

Is situated immediately between the external surface of the external Ala of the Pterygoid Process, and the Condyle of the

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together in the form of a median crest, but are separated by an interval of varying width. These differences in the crania of the male Orangs do not seem to indicate a difference in race; they are rather the indices of age and muscular energy. (1) In the males of both *Tr. Gorilla* and *Pith. Satyrus* the laniaries attain a development almost rivalling their proportions in the more powerful Carnivora. In the females of these species, on the other hand, which are distinguished by the comparatively small size of the canines, the osseous cristæ are proportionately of minor development; the parietal ridges do not unite to form a high sagittal crest, but are continued separately backwards over the upper surface of the cranium, albeit in the female Gorilla they are only divided by a narrow groove. (2) Again, in the smaller species of Chimpanzee (*Tr. niger*) the muscular processes of the male skull are less developed than in *Tr. Gorilla*, the laniaries also attaining smaller dimensions. But in all these great Apes it is only on the completion of the second dentition that the surface for the attachment of the biting muscles becomes thus extended. In the immature Chimpanzees and

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(1) *Vide* Owen, Zool. Trans., vol. iv., p. 165.

(2) Descriptive Catalogue of Osteological Series in Museum of R. Col. of Surgeons, vol. ii., p. 803.

(*a*) [See Plate 2.]

Lower-Jaw; lying, as it were, horizontally along the basis of the Skull. It is somewhat radiated in some bodies; broad at the origin, and small at the insertion; but the greater part of it forms a round strong fleshy belly; so that the part that makes it of the radiated kind is thin.

The thick and ordinary portion of it arises tendinous and fleshy, from almost the whole external surface of the external Ala of the Pterygoid Process of the Sphenoid Bone, excepting a little bit of the root at the posterior edge; and towards the lower part, it arises a little from the inner surface of that Ala. The thin portion arises from a ridge of the Sphenoid, that is continued from the process towards the Temple, just behind the

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Orangs, whilst the cranial portion of the skull is comparatively large, the facial part and especially the jaws are but little developed, the surface of the cranium is uninterrupted, and the temporal fossæ lack the depth which they afterwards acquire, with the full attainment of the powers of combat and mastication. It is at this stage of his existence that the young Ape is so eminently anthropoid: but, "as growth proceeds, the milk teeth are shed, the jaws expand, the great canines succeed their diminutive representatives, the biting muscles gain a proportional increase of carneous fibres, their bony fulcra respond to the call for increased surface of attachment, and the sagittal and occipital crests begin to rise." (1)

It is scarcely necessary to say that no such extension of the temporal fossa is ever found in Man; although in the low, uncivilized races, where the teeth and jaws are put to rough work, it is not unusual to find the arched border of the fossa more strongly defined than in the higher varieties. In both Man and the Quadrumana the zygoma is slightly curved outwards; amongst the latter the outward curve is well marked in the Baboons (*Cynocephali*).

It is in the order Carnivora that the temporal acquires its highest development. This is evidenced by the great depth of the fossa, the outward curve of the zygoma, the development of frontal, parietal, and occipital crests, and the height of the coronoid process of the lower jaw, together with its deeply-excavated external surface. The skulls of the hyæna, wolf, and some of the larger kinds of dog—*e. g.*, the mastiff, blood-hound, &c.—are remarkable for the development and height of the sagittal crest, produced by the union of the frontal and parietal ridges. Amongst the *Felidæ*, the single crest is best expressed in the cranium of the lion; in the smaller species the parietal ridges only meet in the posterior part of their extent. On removing the skin from the upper surface of the head in these animals, we find nothing on each side but the great mass of the temporal, which completely covers the vertex and lateral regions. In the Cat, the muscle is described by Straus-Durckheim as consisting of three portions—an antero-external of large size, which arises from the anterior part of the strong temporal aponeurosis and the anterior part of the fossa, and two posterior portions, of which the internal is the larger, and occupies the

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(1) Owen, Class. and Distrib. Mammalia, Appendix on Gorilla, p. 76.

Foramen Lacerum inferius, which terminates in a little protuberance. This origin is sometimes wanting; and in that case, the Temporal Muscle arises from that protuberance; and very often this origin is common to both. These two origins of this Muscle are sometimes so much separated, as to make it a Biceps.

From these origins the Muscle passes outwards, and a little backwards, converging; that is, the superior fibres passing outwards and backwards, and a little downwards; while the inferior, or larger portion of it, passes a little upward.

It is inserted tendinous and fleshy into a depression on the anterior part of the Condyle and Neck of the Lower-Jaw, upon the inside of that ridge, which is continued from the Coronoide Process. A little portion is likewise inserted into the anterior part of the moveable cartilage of the joint.

When this Muscle acts singly it is a rotator; for it brings the Condyle of the Jaw forwards, and likewise the moveable cartilage, which throws the Chin to the opposite side: but if it acts in conjunction with its fellow of the opposite side, instead of being turned to one side, the whole Jaw is brought forwards, and thus these counteract the Temporal, &c.

These two Muscles generally act alternately; and when they do so, one acts at the time of depression, the other at the time of elevation; so that these Muscles act, both when the Lower-

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two posterior thirds of the same fossa. The three heads unite to be inserted into the coronoid process of the jaw, their fibres covering its surfaces and borders, being attached on the inner side as low down as the dental foramen, on the outer to the upper portion of its surface, and to an aponeurosis common to this muscle and the masseter. (1) If we contrast with the Carnivora the Ruminants and Rodents, we find a wide difference in the development of the temporal, as indicated by the size and depth of its fossa. In the latter orders this space is narrow and shallow, the muscular ridges are but slightly expressed; and in the Ruminants the zygomatic arch is short, and projects but little. (2) As another instance of the close relation which exists between the development of the temporal muscle and the dental type, we may adduce the Camel. In the Camel, canines are present in both jaws, together with a pair of laniariform incisors and premolars in the upper jaw. Concomitant on this higher type of dentition, we find the skull furnished with a sharp and deep but thin occipital crest, a low but sharp parietal crest, "whilst the zygomatic arches are longer and span across a wider temporal fossa than in the ordinary Ruminants," (3) in which the upper incisors are absent, being replaced by a callous pad, the upper canine is in many instances wanting, whilst the lower canine resembles and forms one of the same series with the lower incisors.]

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(1) *Vide* Straus-Durckheim, Anatomie Descriptive et Comparative du Chat, T. ii., p. 216.

(2) Cuvier, op. cit., leçon xvi.

(3) Osteolog. Catalogue R. Col. Surgeons, vol. ii., p. 572.

Jaw is raised, and when it is depressed: yet they do not assist either in raising or depressing it. (*b*)

(To be continued.)

(*b*) [The pterygoids vary in size and function in the different families of Mammalia. They are usually largely developed in herbivorous and frugivorous animals, where they are in direct relation to the lateral and antero-posterior motions of the jaw in mastication. In the Chimpanzees and Orangs, the force and size of the internal pterygoid is evidenced by the roughness and elevations which exist on the internal surface of the posterior border of the ascending ramus and angle of the jaw. (1) In the Rodents, the internal pterygoid, like the masseter, is employed in drawing forward as well as in raising the mandible. To increase the obliquity of its fibres and the backward extent of surface for their insertion, the angle of the jaw is prolonged posteriorly. The Ruminants, and grass-feeding animals generally, have these muscles of large size. In the typical Carnivora, on the other hand, the principal pterygoid is simply an elevator of the jaw, not a rotator or protrusor. In the Cat, the larger muscle (*external Pterygoid*, Straus-Durckheim; *internal Pterygoid*, Cuvier) is flat and of considerable size; it has its origin from the whole length of the lateral border of the guttural part of the palatine bone, and from its corresponding orbital surface, and passes outwards, backwards, and downwards, to be inserted into the inner surface of the lower border of the jaw, into the tendinous *raphé* common to it and the masseter, and into the inner surface of the coronoid. The smaller slip (*internal Pterygoid*, Straus-Durckheim) is almost blended with the preceding; it is placed behind, and is in part internal to and under the principal muscle. None of the fibres of the pterygoid in the Cat are attached to the condyle or to the interarticular cartilage. These muscles, as do the temporal and masseter, present an admirable instance of adaptation to the type of dentition, and to the structure of the joint. (2)]

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(1) *Vide* Owen, Zool. Trans., vol. iv.

(2) *Vide* Straus-Durckheim, op. et loc. cit.; Cuvier, op. cit., p. 88.

ERRATUM.—Page 6, note *k*, for "regularly oval" read "relatively more oval."

ORIGINAL COMMUNICATIONS.

ON CALCIFICATION OF THE DENTAL PULP:

A PAPER READ AT THE MONTHLY MEETING HELD AT THE COLLEGE OF DENTISTS, DECEMBER 4TH, 1860,

By R. T. HULME, M.R.C.S., F.L.S.

(Concluded from page 15.)

If such a tooth as the one previously referred to is divided in half, and one of the cut surfaces polished, the dentine which has been added to the interior of the tooth, subsequently to its completion, can be more or less readily distinguished even by the unassisted eye: this is owing to the modifications which occur in the structure of the newly-formed tissue, and which impart to it a peculiar appearance. The term *Secondary Dentine* has been given to this new tissue, in order to distinguish it from the original dentine of the tooth. The histological characters of secondary dentine vary considerably in different cases, according to the circumstances under which its formation has taken place. In some specimens it is almost transparent, and puts on a horny appearance similar to that which is seen in the fangs of old teeth. The dentinal tubes are few in number; they pursue a wavy, undulating course, or are characterised by abrupt, almost angular inflexions; their branchings are exceedingly irregular, and where they join on to the original dentine they form deep curves. Sometimes this transparent tissue contains here and there large irregular cavities, with tubes branching from them; these structures resemble the lacunæ of the cement and of ordinary bone, but are distinguished from them by their irregular form and larger size. At other times the dentinal tubes become suddenly dilated in their course, and branches are given off from these dilatations. This kind of secondary dentine is found attached to the pulp surfaces of tubes whose terminal branches have been worn away by the action of wires or bands; it also occurs in connection with tubes whose terminal branches are involved in those dark-brown stains on the outer surface of the dentine which are indicative of incipient decay. Teeth in which the grinding surface has been worn away so as to destroy the enamel, have the pulp calcified to a greater or less extent near the apex of the tooth; in fact, that part of the pulp becomes ossified which corresponds to the wearing away on the exterior of the tooth, wherever that may happen to be. In these cases the secondary dentine often assumes many of the appearances which have just been described; but it has not the extreme transparency which it obtains in the two former instances.

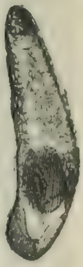
In some cases where the formation of the secondary dentine has taken place slowly, and where there has been little or no irritation from external injuries, the old and the new structures may pass almost imperceptibly into each other; indeed, with a high magnifying power it is impossible to say where the one ends and the other commences; it is only by using a low power, when the general arrangement of the parts can be seen at one view, that the line of junction between the two formations can be detected. Under these circumstances, the secondary dentine may be as dark and opaque from the presence of numerous dentinal tubes as the original structure of the tooth, and the tubes from the two portions pass in a gently undulating curve from one to the other. This kind of secondary dentine is met with in teeth in which the filling up of the pulp cavity has been the result either of age or of a constitutional tendency to ossific deposit, and has not depended upon decay or injury of the tooth.

In other examples the characters of the secondary dentine are intermediate between the two extremes which have just been described; the dentinal tubes are not so irregular as they are in the one, nor so uniform or so numerous as they are in the other. The newly-formed tissue is perfectly united to the original dentine of the tooth; but, at the same time, there is a distinct boundary-line separating them from each, and precisely corresponding to the original limits of the pulp cavity, which are as clearly defined as in a tooth in which no calcification has taken place.

Figure 3 represents a section of a lower molar in which the pulp cavity has been considerably diminished by the addition of secondary dentine to the inner wall of the crown of the tooth. In the specimen from which the drawing was made, the grinding surface was somewhat worn away from the effects of mastication; but there was still a layer of enamel of considerable thickness—indeed, quite as thick as it is usually found in the majority of teeth, and there was no evidence of incipient decay on the exterior of the tooth. The cavity was diminished at its roof and sides, the latter corresponding to the neck of the tooth, where there was not the slightest indication of wearing or other injury on the external surface. In the majority of these old teeth there are usually one or two brown stains on the outer surface of the dentine, indicating a state of incipient decay. Even, however, admitting that these would be a source of irritation, yet in similar cases of commencing decay it is found that the effects of such irritation are confined to the main tubes from which such terminal branches originate, just in the same manner as in the case of teeth which have had a portion of their outer surface worn away by the pressure of a wire supporting artificial teeth. The encroachment upon the pulp cavity in these old teeth will be found to be quite as extensive at other parts of it as where the tubes corresponding to the decay abut upon its interior. It appears, therefore, perfectly justifiable to regard the formation of the secondary dentine and the filling up of the pulp cavity in such teeth as the natural effects of old age, or of a constitutional tendency to ossific deposit.

This process may go on to such an extent as nearly to obliterate the pulp cavity; and it is just barely possible that it should do so entirely, but, certainly such cases are extremely rare. A little consideration of the condition of the parts will show why this should be the case. The pulp cavity in the crown of the tooth is of a tolerable size, but the continuation of it along the fangs is extremely narrow. When ossification arises from age, or from a constitutional tendency, it most probably affects all parts of the pulp alike; and this being the case, the narrow canal of the fang must either become closed up, or so narrowed as to diminish the supply of blood which is requisite for the functional activity of the pulp. The consequence of this is, that there are almost always some small remains of the pulp left unossified in the interior of the tooth.

The effects which are superinduced by wearing away of the crown of the tooth upon the pulp is best shown in the six anterior teeth. Those which most frequently suffer in this manner are the central incisors and the canines (figs. 1 and 4). In many of these teeth there may be observed a central spot of a dark-brown colour: this marks the position of the original pulp cavity, and is, in fact, the formation of secondary dentine, which has been subsequently added in anticipation of the pulp cavity becoming penetrated by the wearing away of the tooth. The destruction of the crown goes on until at length it reaches the newly-formed dentine, which thus becomes exposed to the fluids of the mouth. This appears to imbibe any colouring matter, or to be affected more readily by the fluids of the mouth than the original dentine, and hence it is always of a darker colour than the rest of the tooth (fig. 4). In teeth which have been worn by mastication, when the dentine is examined beneath the microscope it will be found to present the same characters as those which have been previously mentioned, viz., considerable transparency, arising either from the absence of the dentinal tubes or their obliteration; secondly, great irregularity in the direction of those tubes which are present (lacunal spaces).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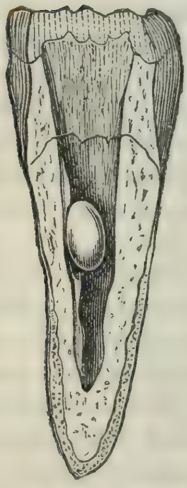
It was remarked, when speaking of ossification in the old tooth, that it was extremely rare, if indeed it ever happened, to find the pulp cavity entirely obliterated. The present specimen serves to confirm the explanation which was given as to the reason why this should be the case. In the present specimen the newly-formed dentine is seen on one side of the section to be connected with the original portion of the tooth throughout its entire extent, whereas on the opposite side it is only connected by a narrow neck so as to leave a small space between the two formations, which in the living tooth must have contained a portion of the pulp, which had either been entirely separated from the remainder, or was in the process of being so separated.

The next form of injury which has been mentioned as superinducing these changes in the cavity of the tooth, is the presence of wires or bands which have worn away the necks of the teeth when supporting artificial teeth. These specimens are exceedingly interesting, in consequence of the very precise manner in which the extent of the injury is defined, and the similar precision which exists in the boundaries of the dentine which is added to counteract them. The specimen in illustration of this is a section which was made as far back as the year 1847. It is described in my note-book as a canine tooth worn away at the notched part by a wire which had supported artificial teeth, and appended to it is the following remark:—"In this case, there has evidently been a greater change produced by the wire than the mere wearing away and formation of a notch; even to the naked eye, all the tubes are evidently changed from their external terminations inwards to the central cavity, where there is a projection produced by a new growth of dentine. This is clearly in anticipation of the wire penetrating the pulp cavity, which before that had taken place would by this means have become filled up."

As the dentinal tubes pass from the pulp cavity, they diverge somewhat, and terminate by subdividing into a number of delicate twigs. In consequence of this arrangement, any given number of tubes occupy a wider space at their termination on the exterior of the tooth than at their commencement on the interior. When, therefore, such a specimen as the one just referred to is examined beneath the microscope, it will be found that the boundary-lines of the injured part do not pass parallel to each other from the exterior to the interior of the tooth, but that they converge as they approach the pulp cavity. Every terminal twig transmits its impression of the injury it has received to the branch from which it proceeds; this, again, to one from which it has been derived, until at length it reaches the main dentinal tube, from whence all the branches emanate. The same circumstance occurs with the other terminal branches, and thus the effect of the injury may at last be traced to those primary tubes whose branches correspond to the extent of the surface which is worn away by the wire. It is exactly opposite the mouths of these tubes that the newly-formed dentine is added.

Another form under which calcification occasionally occurs, is that of a nodular mass attached to the inner surface of the tooth, and projecting into the pulp cavity (fig. 5). The writer has not been so fortunate hitherto as to meet with an example of this kind, and is indebted to a paper of Mr S. J. Salter's, published in the 'Transactions of the Pathological Society' for 1855, for the following abstract of a case which that gentleman has recorded, and also for the accompanying drawing. The tooth was a central incisor, which had been extracted from a woman on account of severe neuralgic pains obviously connected with one of the central incisors of the upper jaw. The pain was described as of a gnawing character, abiding, but not constantly severe, frequently amounting to a mere consciousness of the presence of the tooth, and at other times sharp and darting. In the former condition it was confined to the region of the tooth; in the latter, it flashed up the side of the face, and through all the branches of the superior maxillary division of the fifth nerve of that side. Sudden pressure or a tap upon the tooth, or a marked change of temperature, produced a considerable augmentation of pain. The tooth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itself was sound, to all external appearance; it was somewhat elongated beyond its fellow, and was very slightly loose. The gum surrounding it was red at the edge, and a little swollen. When the tooth was removed, no exostosis was discovered on it; and with the exception of some small patches of half-organised lymph, it appeared quite healthy.

Upon making a vertical section of the tooth from side to side, an oval pear-like excrescence of dentine was found growing from the side of the pulp cavity, so as to encroach much upon it, and occupying for a short space more than half its diameter. It was of an oval form, its long axis corresponding to that of the tooth; in colour less opaque and yellower than the neighbouring tissue.

The structure was of that irregular character which has been previously described as occurring in secondary dentine. The removal of the tooth was accompanied with a violent paroxysm of neuralgic agony, but was followed by a total cessation of pain, and the cure was permanent.

The next point to be considered is that which forms the most important portion of the present communication, namely, as to what are the changes which caries produces in the interior of the tooth. If a section is made of a tooth in which caries has commenced, a dark-brown stain is visible on the external surface of the dentine: when such a section has been properly prepared, and is examined beneath the microscope, other changes become evident. Where the caries is slight, the tubes of the dentine are seen to have become transparent immediately beneath the diseased part, in consequence of their having become consolidated by the deposition of calcareous matter. Very frequently this transparency is continued down the whole length of the tubes, as far as the pulp cavity; and, in addition to this, the cavity itself has become encroached upon by the addition of fresh dentine to the original structure of the tooth. In fact, these changes are much the same as those which have been previously described when speaking of the other causes which affect the integrity of the outer surface of the tooth.

That this is partly the means by which nature endeavours to prevent the ultimate destruction of the tooth, can scarcely be doubted. In one of the specimens on the table, it will be seen that the decay, which has extended to a great depth on the crown, has failed to reach the pulp cavity, in consequence of the addition of secondary dentine to the interior of the tooth in the way which has been previously mentioned. In fact, this caries did not necessitate the extraction of the tooth; but another caries having commenced at the side, penetrated the pulp cavity, and it was this which caused the loss of the tooth.

In another case, that of a bicuspis, the decay is seen to have penetrated the pulp cavity, but not before the greater portion of it is occupied by the newly-formed dentine.

I would here remark that, in addition to the general term *Secondary Dentine* applied to these new formations, some writers have also proposed to distinguish the dentine which orignates under the various circumstances which have just been enumerated by specific names. Thus, that which is formed under the influence of caries, or by the pressure of a wire or clasp, has been named *Dentine of Repair;* where the structure is very irregular, and if there are Haversian canals, it has been termed *Osteo-dentine;* and Mr Salter has proposed the term *Nodular Dentine*, where the new structure forms projecting masses, as in the case which has been selected from that gentleman's paper. I venture, however, to think that this is a somewhat unnecessary multiplication of terms. The histological characters of these formations pass into each other imperceptibly; and I do not think it would be possible, in general, to say under which of these circumstances a portion of secondary dentine had originated. It would, therefore, be sufficient if the one term *Secondary Dentine* was applied indiscriminately to the new structure which arises under the several conditions that have been mentioned.

In addition to the changes superinduced by caries in the dentinal tubes, and the formation of new dentine in connection with the original tooth structure, the pulp itself undergoes some very interesting and important modifications.

The presence of small osseous particles in the cavity of the teeth had been noticed by Bertin, Rousseau, Oudet, and others, more especially in the molar teeth of the Hare, Sow, and Stag. The most accurate description of these formations is given by Raschow, who describes them as "semi-transparent, for the most part oval and rounded bodies, which were situated in the axis of the dental pulp towards its apex, in irregular rows, never extending the whole length of the dental pulp, but only to a greater or less distance from the coronal extremity." Such examinations of the dental pulp are facilitated by the use of the compressor; but without its assistance the same results may be obtained, though with more trouble.

In the Human subject, the matter has been very ably treated by Mr Salter, in one of his papers in the 'Guy's Hospital Reports.' The important point in Mr Salter's communication, and which he has been the first to direct attention to, is the different manner in which these masses of ossific matter are formed, when compared with those varieties which have been previously described under the title of *Secondary Dentine.* In the formation of the dentine of the tooth, and also in that which has been named secondary dentine, the nerves and blood-vessels recede from the part in which dentification is proceeding, and it is only the cells of the pulp which are concerned in the process: on the contrary, in the formation of these nodules of ossific matter in the substance of the pulp, all the elements which enter into the formation of this organ seem to be included; and there results an ossification, which includes alike the nucleated cells, the connective tissue, the blood-vessels, and the nerves. This process, therefore, differs essentially from that which results in the formation of secondary dentine, and may be correctly termed *Ossification* or *Calcification* of the dental pulp. The best mode of examining the ossified pulp is to add a small quantity of caustic potash or soda, which, while it renders the parts more transparent, at the same time causes the nerves to become more distinct; the latter can then be traced up to the osseous mass, and are seen to enter it, or to become involved in it, and again to emerge from it. Mr Salter correctly says that almost every carious tooth will be found to have its pulp more or less ossified, but I cannot agree with him when he says that it occurs most frequently, and to the greatest extent in the fangs. I believe, myself, that the point of greatest ossification occurs nearest to the carious part, so long as inflammation has not been set up in the pulp to such an extent as to produce disorganisation of the part. This will, perhaps, be best illustrated by the following note of a carious tooth.

The patient was a gentleman aged twenty-five. The first lower molar on the right side was considerably decayed on its median surface. The decay had commenced on the grinding surface of the crown, and penetrated inwards towards the pulp. The teeth were rather crowded, and the white opaque appearance of the enamel next the bicuspid tooth indicated the extent to which the decay had extended and destroyed the subjacent dentine.

The tooth was extracted without more difficulty or more pain than usual, and there was little or no inflammation around the fangs.

Examination of the Tooth.—The decay extended to the pulp cavity, and the median third of the crown was more or less affected by caries. The tooth was then broken open, and the pulp examined. It was of a pinkish colour, and did not appear to be more vascular than usual. On endeavouring to withdraw the pulp from the cavity, at the part which was directly under the carious portion there was found a solid lump of osseous matter as large as a small seed: it was not adherent to any part of the inner wall of the tooth. On examining the remainder of the pulp beneath the microscope after the addition of a solution of caustic soda, it was seen to be thickly crowded with rounded masses of dentine, but more opaque and of a different character to the dentine globules of Czermac. The drawing represents the appearance presented by this portion of the pulp.

I have here a specimen in which nearly the whole of the pulp has become ossified in this manner, but in which the newly-formed bone has formed no union with the crown of the tooth.

In another of these specimens it will be seen that the process has commenced in contact with the original dentine at the bifurcation of the fangs, and has proceeded to a great extent in filling up the pulp cavity.

I have thus, Sir, endeavoured to bring before the Meeting a general summary of all the information that we possess concerning these processes of the formation of *Secondary Dentine*, and of that which may be correctly termed *Ossification* of the pulp. I am quite aware that these changes have at different times and in various publications been described by previous writers, but I have nowhere found that any practical application has been made of them. In none of the works on Dental Surgery with which I am acquainted have I found any indication that we should rely upon the remedial process which is thus set up by nature in our treatment of caries.

Of late years the attention of the Profession has been turned rather to the best means of destroying the pulp in advanced caries, and subsequently stopping the tooth, than to the best means of preserving the integrity of the pulp, and thus retaining as far as possible the integrity of the tooth.

There can be no question that if it is possible to preserve the pulp of the tooth, and then stop, that such a tooth is in a far more healthy condition than where the interior of the crown and the fang is filled with gold or any foreign material. I feel no hesitation in saying, that many of the teeth which of late years have been treated by destroying the pulp might, under another mode of treatment, have been preserved without sacrificing this essential portion of the organ. So long as there is any portion of dentine existing over the pulp, as a general rule, it should never be removed, even if the dentine is softened nearly to the surface of the pulp. I have found in many cases that, by a palliative method of treatment, teeth which would otherwise have been sacrificed, may by this means be preserved. If caries, so far as the actual destruction of the dentine is concerned, is a purely chemical process, it is at all times in our power to put a stop to these chemical changes by the application of proper remedies, and by protecting the decayed part from the action of the fluids of the mouth. Once these chemical changes have been arrested, there seems to be no reason why the remainder of the dentine, even if it is partially impaired, should become a source of irritation to the pulp. I will cite one case in illustration. The patient was a female, aged twenty-four, enjoying moderate health. The first molar in the lower jaw was much decayed on its distal surface, the caries reaching quite to the centre of the crown. There had been an uneasy gnawing sensation in the tooth, and pain in eating. The interior of the decayed tooth was very tender, and required great care in removing the particles of food. A temporary stopping, made of cotton, with a solution of mastic in spirits of wine, was put in, and renewed two or three times in the course of a month. On each occasion, when the cotton was removed the tenderness was greatly diminished, and some of the decayed portion of the tooth was taken away. The cavity was afterwards filled with cotton and spirits for some time, and at the end of about two months the tooth was permanently stopped. The first upper bicuspis on the right side was in a still worse state, and I had but little hopes of saving it; but after similar treatment for the same length of time, it was permanently stopped. For a day or two, there was some tenderness in this tooth; but this subsequently subsided, and the tooth still continues an efficient agent in mastication. The lower wisdom tooth on the right side of the mouth, and the upper wisdom tooth on the left, were also decayed. The first of these teeth was not so far gone, and was readily stopped after a short preparation; but the upper wisdom tooth had lost nearly the whole of the central part of the crown, and on one or two occasions, while it was under treatment, gave rise to a short and moderate attack of toothache; yet at the end of three months the tooth was also capable of being stopped. Any other mode of treatment in three of these teeth would, I believe, have necessitated either the destruction of the pulp or the extraction of the tooth.

That there is nothing very novel in the above plan I am ready to admit, and doubtless others have adopted the same method of treatment; but what I venture to assert is, that such treatment has not been carried on upon any definite system, or for the purpose of allowing Nature to convert the pulp of the tooth into osseous matter, and thereby repair to the best of her power the ravages which have been inflicted by disease upon the tooth.

There is one question connected with the present subject which I should have been very desirous of determining, had it been in my power, before the reading of the present paper; and that is, the rate at which calcification of the pulp proceeds. It requires, however, not only a very extended series of cases, but also the conjunction of some fortunate and special circumstances, to enable us to determine this question, and I would invite the attention of Members to the investigation of this very important and interesting point in dental pathology.

In conclusion, I would remark that another practical point connected with the processes of the formation of secondary dentine and calcification of the tooth pulp, is the possibility of these changes giving rise to neuralgic pains about the head and face. In the case which has been recorded in the course of the present paper, these pains depended upon a nodular mass of dentine pressing upon the pulp; but when we find that in the ossification of the pulp the terminal branches of the nerves are also involved in the new formation, it is possible that this process should also give rise to similar symptoms. A tooth extracted under these circumstances might, to all external appearances, be perfectly sound; and even if it were broken open, unless the pulp was examined by the microscope, the minute granules of ossific matter might pass undetected.

THE DENTAL REVIEW.

LONDON, FEBRUARY, 1861.

We regret that our desire to enter as little as is possible into the dusty arena of political strife is at a very early stage peremptorily removed. We must be careful for peace certainly, but not cowardly nor false when the defence of a great principle demands our assistance. Now, an event has occurred within the last month which necessitates remonstrance. The South Hants Infirmary is to be supplied with the services of a Surgeon-Dentist. It happens that amongst those local practitioners who are likely to apply for the office, there is one who has the Certificate of the College of Surgeons; the others, too independent to be honoured by such a bastard pledge of professional standing, have remained either neutral in politics, or leaning to the side of an independent political organization, but each and every one resting scientifically and socially on many years of well-bought experience and unsullied reputation. Well, to make a perfect job of this appointment, the Committee of the South Hants Infirmary has proposed to pass a rule for the candidature, that no one but a Certificiate of the Royal College of Surgeons shall be allowed to offer himself for election. Thus, three other Dentists, if this grossly illiberal policy shall prevail, will be cut off from all opportunities of proof that they even possess the qualifications for the office in hand. The three excluded gentlemen may have the leading practices—may attend on the wants of the Governors of the Institution, but not on the poor; and this, because the poor patients of the South Hants Infirmary require not only a Dentist, but an officer put together after the sagacity of one particular Dental clique. Granting, moreover, that this iniquitous law should be carried out, the evil does not rest on the mere fact of an unfair election: it is reflected into private life. These men, who are not allowed to compete for a public office, will either be advertised as tabooed Dentists, or enforced, contrary to their consciences, contrary to their feelings, and contrary to the necessities of the time, to subject themselves, *nolens volens*, to the acceptance of a sham examination and a distasteful alliance. Is this English justice? We see in it a tyranny the like of which has not been noted in modern times, in professional life.

But the evil does not rest even here: it is reflected also upon those who have actually taken the College of Surgeons' Dental Certificate. It is pretty generally known that at this time nearly all the Practitioners of Medicine and Surgery in the United Kingdom are opposed, heart and soul, to the Dental-certificate system of the College of Surgeons. To such an extent is this feeling carried, that, as we hear, in one or two Medical Institutions where there is in contemplation the foundation of Dental appointments, the Medical Staffs are opposed to the election of men who flourish this objectionable, and, as it is considered by the Medical Faculty, pseudo qualification. For our parts, as Dentists, we should under ordinary circumstances oppose this exclusive policy; but what argument remains for opposition of such kind? What resting-place have we for a liberal sentiment and expression, if on the opposite side men well qualified for important duties are directly excluded because they hold a broad policy, and are the advocates of professional unity and independence? Of course, all argument is futile, and we must reluctantly be silent, even in behalf of our own body and its vital interests.

The facts of the case dispassionately placed are these: we have uttered them before, and we restate them, assured of contradiction from none except from libellous, false, selfish, conceited, and vulgar men: the facts, we say, are uncompromisingly these:—The Dental Profession is now fairly divided into two parties. The one rests for its success on a side qualification, without rank or power; the other, on a qualification belonging purely to Dentistry, and based on the principle of a well-conducted, efficient, and independent Dental Institution, having its own objects strictly defined, and its representation essentially professional. To insult the members of the latter body by calling them low names, impugning their motives and throwing calumny over their lives, is mere madness, the offspring of suspicion and innate falsehood. At these attacks the Members of the College of Dentists may laugh, as indicating, not disaster, but the real success they have so worthily obtained. They may laugh, too, as knowing that, with their funds in the present good position, their general popularity so markedly distinguished, and their progress so steadily advancing, they are safe, and ready to run the race before them to any extent and for any time.

As reasonable men, then, we must accept things as they are, and await the issue.

Returning to the South Hants Infirmary, we rejoice to see that the Medical Press unanimously supports the views we have advanced. Even the 'Lancet,' from which the independent body of Dentists has never before received assistance, has dealt out its thunders with deserved force against the "arbitrary and uncalled-for stigma" which the Governors of the Infirmary would inflict on competent but uncertificated Dentists; while the 'Medical Times' and the 'Medical Circular' speak on the same side with unrestrained criticism. We take this able support with unreserved thankfulness; by its side we may well afford to treat with merited contempt the insults of men to whom, as opponents, we would act as Professional friends and co-workers, if they on their parts had the grace and the intellect to become respectable company; and we close our notice of the events above described not without the knowledge that when the general feeling is better known, even the Governors of the South Hants Infirmary may hesitate before they commit themselves to a political tyranny of which, if carried out, every genuine Englishman would be honestly and heartily ashamed.

Another of those violent and unscrupulous Editorial productions, so contrary to anything like good feeling or honesty of purpose, has just been issued by our contemporary the 'British Journal of

Dental Science.' Whether, indeed, the confusion which exists in the wording of this article is the result of ignorance or of design, it is difficult to say. Interpreted according to the rules of logic, the obnoxious passage in which certain Dentists are accused of being Barbers, Blacksmiths, Chemists, and Photographers, refers to some mythical list of Dentists. Taken in conjunction with the preceding and subsequent passages, together with the Editor's avowed intention of carrying on his crusade against the College of Dentists, there can be no doubt that it is intended it should be so interpreted as applying to that body. That the Editor of the 'British Journal of Dental Science' regards the College of Dentists as a positive evil, we can readily believe. He had fondly imagined that before this he would have succeeded in closing the doors of that Institution. On the contrary, the Dental College is gradually gathering strength, the number of its members is increasing, its Certificate of Membership is publicly recognised, and the possession of it is felt to be a guarantee of the fitness of candidates for public appointments. These circumstances fully account for the frantic state of the unfortunate Editor when penning his leading article for the first month of the new year. We can, however, assure our readers that the Council of the College of Dentists will not allow such mendacious assertions to pass by unquestioned, and that the Editor will be called upon to prove the truth of his statements, or to explain the meaning of the passage referred to. The writers in the 'British Journal of Dental Science' have been so long in the habit of abusing every one connected with the College of Dentists, that they seem to consider they may be permitted to go to any length with impunity in their libellous and scurrilous attacks. There is, however, a limit beyond which those who represent the College of Dentists will not quietly submit.

SELECTED ARTICLES.

TREATISE UPON THE GENESIS AND DEVELOPMENT OF THE DENTAL FOLLICLES TO THE EPOCH OF THE ERUPTION OF THE TEETH.

By Drs Ch. Robin and E. Magitot.

(Translated for the 'Dental Cosmos,' from the 'Journal de la Physiologie de l'Homme et des Animaux,' Dr E. Brown-Sequard, Editor, by E. Sureau.)

(Continued from page 27.)

Section 2.—*Of the jaws before the appearance of the follicles.* Reckoning from the epoch of the union of the tubercle or incisive bourgeon (become simple instead of double as heretofore) with the bourgeons or superior maxillary prolongations of the first visceral arch, the ulterior condition of both of the jaws, previous to the appearance of the dental bulbs, can be considered individually.

Lower Jaw.

At the time when the two bourgeons of the inferior maxillary arch unite, the jaw of the human species has the form of a small ogive arch, thin and sharp at the anterior or superior edge. Almost immediately after the junction is formed, *Meckel's cartilage* appears nearly in the middle of the thick part; it is continuous with that of the opposite side upon the median line, and is more resistant in its middle part than at the two extremities. It extends on each side to the base of the middle cerebral cell. This organ will be described subsequently; what has been already stated is sufficient for our purposes at this moment. The cartilage of the inferior maxillary rises on the external side of *Meckel's cartilage*, very near it, and at about the middle of its length, and consequently in the external part of the first visceral arch. The cartilage of the inferior maxillary is at first very soft, flattened at the sides, and raised more behind than in front, where it is almost pointed, which gives it an elongated triangular shape at the blunt angles.

It originates by genesis, in the same manner as the other bones, such as those of the base of the cranium, the body of the vertebræ, &c.* This cartilage afterwards occupies the whole length of each side of the jaw, but it remains for a long time separated from its congener.

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* Bischoff, speaking of the inferior maxillary, says: "The articular surface is produced by histological separation, in the same manner as the sides of the vertebræ are separated."—*(Traité du Developpement.)* This fact cannot be considered as applying to the cartilages of the jaw and of the *rocher*. One of the authors of this work has proved, by direct observations upon the human embryo, and upon those of the cow, hog, rabbit, sheep, and rat, that

The lower jaw, regarded thus in its totality, is found to be composed in the following manner :

1st. On the outer side of *Meckel's cartilage*, which is at the centre, is a narrow, elongated cartilage, which is a little raised in the vertical direction ; this is the cartilage of the inferior maxillary, and two protuberances presently appear behind it, which become the coronoid and condylar apophyses of the ascending branch. It is thicker transversely in front of these protuberances than at the level and at its anterior part, but presents no groove. The first traces of ossification appear near the middle of this cartilage ; they are elongated in form, and show themselves only about the thirty-fifth day. The whole cartilage, which is hardly two-hundredths of an inch in thickness, is rapidly invaded by ossification. Two very thin ridges then appear on the superior edge of the bone ; these do not exist in the cartilaginous state ; they originate according to the method of ossification called invasion. At an early period these give the bone the appearance of a bi-laminated organ ; that is, one formed of two parallel osseous bands, although the ossification began at one point only. These ridges limit the groove in which the follicles originate—this deserves a minute description, which will be given later.

2nd. Around the inferior maxillary cartilage is a comparatively thick bed of soft gelatiniform tissue, covered with epithelium. The most superficial sub-epithelial portion of this has the office, by its ulterior development, of forming the mucous membrane, the remainder representing the sub-mucous tissue.

The cartilage exhibits the ordinary structure of cartilages of ossification in irregular polyhedral or ovoid chondroplasts. The soft tissue is formed of a mass composed principally of embryoplastic nuclei (called fibro-plastic by many authors) ; these are united to a small number of fibro-plastic fusiform bodies, and are traversed by capillary vessels. A little transparent amorphous matter is found interposed among these elements. The whole of this tissue is covered with a very thin bed of epithelial cells, that are broad and mosaic-like at the surface, small and polyhedral beneath. When the whole jaw is placed under the microscope, and but slightly magnified, this epithelial plate, the nuclei of which are only then discernible, looks like a bed of small globules that have been made slightly polyhedral or pavimentous (*like a mosaic pavement*) by their proximity to each other. This appear-

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neither the cartilages of the lower jaw nor those of the sides are in continuity of texture, at the time of their genesis, with those against which they articulate, no more than the occipital is at first continuous with the atlas. All these cartilages originate like distinct organs separated by a bed of laminated tissue at the very level of the passages where the articular cavities will be at a later period.

ance is especially owing to the fact that the dark colour of the nuclei is affected by the transparency of the substance of the cells which are interposed between them.

Upper Jaw.

The cartilage of the body of the superior maxillary first appears in the shape of a small, narrow lamina placed horizontally below the eye; it is slightly convex and a little inflated on the outside, while the inner edge is very thin. It is this edge which unites, in the human species, with the external edge of the incisive or intermaxillary cartilage. This exists for some time as a thin triangular lamel, which is a little thicker before than behind at the blunt posterior summit. The back part unites in front to the cartilage, properly called maxillary, at the time when the first point of ossification appears in the alveolar edge of the latter—that is to say, near the fortieth or forty-fifth day. An osseous point appears in the incisive two or three days after this, as well as we can judge from the pieces and by comparison with the other mammifera. As to the soft parts that surround these organs, they exhibit the same texture as those that surround the inferior maxillary, their thickness being even less. It will also be seen later that, during ossification, the dental groove is developed by a method of ossification similar to that by which the groove of the inferior maxillary is produced, and that this groove exists before the appearance of the dental bulbs.*

The union of the soft parts of each half of the palate with each other, and with those of the median partition of the nasal fossæ at the mesial line, occurs before the appearance of the dental follicles. It takes place, as we have already stated, near the sixtieth day. It is really in the ninth week that the mouth is formed by the occlusion of the nasal fossæ above the tongue. It is also to be remarked that at the time when the follicles appear in the upper jaw, the corresponding lip already exists, like a narrow fold with a thin edge.

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* According to M. Guillot, "these primitive traces (those of the teeth) originate at the same time as the first traces of the bone, before the muscles, *nerves, and blood-vessels can be distinguished in the different parts of the face.*" And again: "The dental spheroids really appear first, the bones after them; the mucous membrane and the periosteum belong to secondary creation."—(N. Guillot, Recherches sur la genèse et l'évolution des dents et des mâchoires; *Annales des Sciences Naturelles*, Paris, 1859, 8vo, vol. ix., pp. 288, 289, 310.) Dissections upon the fresh fœtus, and not upon preserved pieces reduced to thin cuts, and the microscopic examination of fresh preparations, make it easy to prove that this opinion is erroneous. The vessels, nerves, bones, and many muscles of the jaws are already developed, and easily seen by transparency, or even readily dissected, previous to the time of the appearance of the dental follicles. The following paragraph will demonstrate the exactitude of the latter facts, which have been long known elsewhere.

TOBACCO—ITS EFFECTS UPON THE GENERAL HEALTH, AND ITS INFLUENCE UPON THE TEETH.

(From the 'American Journal of Dental Science.')

(Concluded from page 33.)

Too many are accustomed to class the two as similar evils, attributing all sorts of morbid consequences alike to their use. The brain under opium is not soothed or lulled into rest: it is simply benumbed, partially paralysed, and has often a fearful reaction; deranges the secretions by suspending some and over-stimulating others, operating through the nervous system upon the whole animal economy; whilst tobacco is incapable of any of these, exciting at first, but generally soothing and quieting in its permanent effect. In far the majority of persons that tobacco may be said to injure, there will be found a constitutional debility, with habits and occupations increasing this natural tendency, and thus inherited and acquired evils are mostly charged upon tobacco, when at worst it may have only added to an unavoidable decay; for these same conditions are as frequently found in persons who do not use it in any manner, as in those who do. Indeed, we venture little in asserting that among women, who cannot be said to use tobacco, there will be found as much impaired nutrition, more indigestion and derangement of the various secretions of the nervous system, and especially of the liver, than among chewers and smokers. Of course this is a mere assertion, but is it not the proverbial observation, and does not the practice of medicine indubitably point to women as those most frequently demanding the aid of the physician?

It must be borne in mind that we are not advocating that tobacco is in all cases harmless, for we admit that its excessive use is always more or less injurious, productive of minor evils, principally, perhaps, of the nervous system—but claim that it seldom runs into the course of grave disease, as no well-authenticated case of death has been proven attributable to it. Its moderate use by individuals of no particular proclivity to disease, must be recognized as inoffensive; but to invalids and those of peculiar idiosyncrasies all habits are injurious that produce any disturbance except those of a curative character. Prof. Christison affirms this position by saying, "no well-ascertained ill effects have been shown to result from the habitual practice of smoking," much the most questionable form in which tobacco can be used. Beck states that "common observation settles the question, that the moderate and daily use of tobacco does not prove injurious; and this is the general rule,"—exceptions necessarily exist. Critical inquiry will establish beyond cavil, that the use of the plant is much less injurious than all other narcotics: opium, Indian hemp, the betel and the hop, have all distinct and positive evils in their train,* whilst tobacco has had simply vague charges of serious disease without proof or substantiation.

We are not forgetting that the Turk is, perhaps, the most abandoned user, as well as the most retrograding of civilized men, but all enlightened judgment will trace this to more radical causes than this simple habit. His geographical position, climate, religion, social and political government, all proclaim him to be the victim of destiny, and the progenitor of increasing moral and physical infirmity.

That tobacco is preservative of the teeth, is by far the easiest of proof. The teeth decay principally from long contact with matters found in the mouth, whether it be acids, alkalies, or putrescent substances: it requires the action of one or all of these for a continued length of time to produce decay; so much so, that this would fail to produce this effect, did not the mechanical form of the teeth aid this result through the indentations, fractures, and fissures in the enamel admitting these destructive agents into the interior of the tooth, where the operation of exchange of elements takes place by a slow but unobstructed process.

Often the health of the mouth has really little to do with the decay of the teeth; for the gums and the various secretions may have been perfectly healthy, but from the form of the teeth admitting fluids to come in contact with the dentine, and there remaining until their destructive character is completed, when decomposition of the bone must go on until these causes are removed.

The greatest source of caries in the teeth, however, is found in the unhealthy condition of the fluids of the mouth, and the want of absolute cleanliness, in order that these corroding agents may be entirely removed; and any procedure which will accomplish this end will effectually avoid the consequences, with the previous exception considered. We believe the most visionary antinicotianist has never supposed that tobacco diseased the glands of the mouth, and we have shown that the quality of the salivary secretions is not altered in the least, being confined exactly to quantity. We will not stop, therefore, to predicate any hypothesis of disease, but simply claim for its use the preservation from decay in the teeth, from the frequent removal of the secretions, thus preventing their lodgment, and consequent alteration or decomposition. Not only as to the fluids themselves, but particles of food which become loosened are ejected from the mouth which otherwise would remain and decompose. In chewing, a double purpose is fulfilled by adding to the foregoing the mechanical friction of the tobacco itself, which induces cleanliness as well as health to the gums, by hardening their surfaces, and giving, as it were, a kind of exercise or action promotive of health.

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* Christison reports the observations of MM. Parent, Duchatelet, and D'Arcet, "among four thousand workmen in the tobacco-manufactories of France, that they found no evidence of its being unwholesome."

In the elements of tobacco, there is nothing which can possibly attack the substance of the teeth, the organic acids of the plant are too mild, and must be inoperative; the organic bases, as lime, potassa, ammonia, &c., can only act as antagonistic to destructive acids; whilst the nicotin is protective of all animal tissues from decomposition: so that here is positive good resulting.

That it can have a reflective bad effect upon the teeth, is impossible to suppose, from the entire absence of any proof of its being the cause of any grave disease or organic lesion, which alone induces a secondary action. Observation will more clearly establish this. The best natural dentures coming under the writer's notice has been in the mouths of tobacco-chewers of middle-aged men, whilst women have proverbially much less perfect teeth than men, and we may fairly claim that part of this greater perfection may be derived from the habit of using tobacco, and we therefore claim that it has rather a kindly and preservative influence upon the teeth. B.

PROCEEDINGS OF DENTAL SOCIETIES.

COLLEGE OF DENTISTS OF ENGLAND.

ANNUAL GENERAL MEETING.

THE fourth Annual General Meeting of the Members of the College of Dentists was held on Tuesday, January 22nd, 1861, at the College, in Cavendish square.

At half-past seven o'clock, the President, GEORGE WAITE, Esq., took the chair, and after a few preliminary observations having reference to the business of the evening, called upon Mr RYMER, one of the Honorary Secretaries, to read the Report of the Council. Mr Rymer accordingly read the Report, as follows:—

THE PAST YEAR has been one of considerable importance in the history of this College, and has witnessed in the face of the most strenuous opposition the attainment of some of the primary objects for which the College was organised.

In accordance with the announcement which was made by the Council in the last Annual Report, Certificates of Membership were issued in the early part of the year. The Certificates are of two kinds: the one granted by the Council to those gentlemen who have become Members by election, while the other is given by the Court of Examiners to those gentlemen who have undergone the necessary examination.

In the issue of these Certificates, every possible care has been taken to limit their possession to those Members of the Dental Profession who conduct their practice in an honourable manner and in strict accordance with the laws of the College.

This proceeding on the part of the Council induced some of the political opponents of the College to publish the "Protest" with which every Member is familiar, in the columns of the public press.

The Council would willingly have passed over the events connected with that Protest, and it is only referred to on the present occasion in order to explain the very large expenditure in which the College has been involved during the past year. Arraigned before the bar of public opinion, the Council had no alternative but to issue the Counter-Protest which was published in the following week in the 'Times' newspaper. It was evident that matters could not rest as they had done: it was no longer a mere question of opinion between two political parties; the adversaries of the College had made an appeal to the general public, who were little calculated to judge whether the Dental Profession should have a separate organisation and government of its own, and whether the proposed alliance with the College of Surgeons was agreeable to the Members of that College, or was only the act of a small but irresponsible minority.

Thoroughly convinced of the soundness of the principles upon which the College had been established, and strong in the integrity of the motives which had governed their conduct, the Council, nevertheless, paused before the expression of disapprobation which these gentlemen had placed before the public. At no period in the history of the College has the Council had greater difficulties to contend with, or a more heavy responsibility thrown upon them, than at the critical period which is now referred to. It was absolutely necessary that some public expression of opinion should be obtained in order to justify the Council in maintaining the constitution of the College. Under these circumstances, it was decided to make an appeal to the Medical Profession at large; to ask, in fact, that portion of the public who were best competent to form an opinion, what were their views and feelings upon the questions at issue between the College and its opponents.

In answer to this appeal, the Council received the signatures of 3,000 Medical Practitioners in favour of an independent organisation of the Dental Profession, and condemnatory of the proposed alliance with the College of Surgeons.

These names were obtained from the Medical men of England alone, the letters of inquiry not having been extended to Scotland and Ireland.

It is the expenses connnected with this appeal which form so large an item in the account of the past year. Large, however, as the expenditure has been, the Council feel that the response on the part of the Medical Profession has so strengthened the position of the College, that they were fully justified in the course which they pursued.

In April last, the Inaugural Session of the Metropolitan School of Dental Science, which had been established through the instrumentality of the College, was successfully brought to a close under the able presidency of Mr John Brady, M.P., a gentleman who is well known to have paid the greatest attention to the subject of Medical Reform. The Council refer to the formation of this School with much satisfaction, as it was one of the principal objects of the Founders of the College to institute an educational scheme worthy of the Dental Profession. The Council are convinced that all who have taken an active interest in the School and examined the details of its operation will acknowledge that the instruction imparted is of a thoroughly practical nature, and well calculated to assist the student in taking such a position in the Profession as shall entitle him to general respect.

The gold and silver medals offered by the College were awarded by the Faculty of Lecturers, assisted by the Council, as follows: The gold medal to Mr John Driscoll, for general proficiency; the silver medal to Mr Stephen Hoole, for proficiency in Mechanical Dentistry.

The Council having been present at the examination for these prizes, willingly bear testimony to the knowledge and ability displayed by these gentlemen, and are entirely satisfied with the awards which were made.

The Second Session commenced in October last, under circumstances of an encouraging nature, and the School is at the present time in excellent working order.

During the year, four Conversazioni were held. The attendance on these occasions was large, and the objects of interest lent for exhibition by various contributors materially conduced to the success of the meetings. The Council desire to return their best thanks to those gentlemen who so liberally and kindly assisted them on those occasions.

Two Courses of Lectures were delivered during the last Session; namely, one by Mr Hulme, on the "Structure and Development of the Teeth," and one by Dr Richardson, on "Anæsthesia and Anæsthetics." Reports of these valuable Lectures will be found in the Transactions of the College lately distributed amongst the Members.

In September, a requisition was received by the Council from several Members, desiring that the ordinary Monthly Meetings should be resumed. Arrangements have, therefore, been made to comply with the request; but the Council having already sufficient to engage their attention in directing the affairs of the College, a Special Committee has been appointed for the purpose of conducting these meetings.

The Library and Museum have received several important additions since the last Report, as will be shown by the statement of the Librarian and Curator. The Council feel assured that the Members will join them in acknowledging the kindness of the respective donors in thus contributing to this necessary educational department of the College.

The Library and Reading-room is now supplied with the principal Medical, Dental, and other Scientific Publications, and is open four evenings in the week for the use of Members and Associates of the College, and for the Students of the Metropolitan School of Dental Science.

The Council refer with extreme regret to the removal by death of one of the Vice-Presidents of the College, Mr James Harley, who expired in August last, having been a constant attendant at the Council Meetings up to the period of his last illness, and a warm supporter of the College from its foundation.

The conditions of the first competition for the prize of Twenty Guineas, offered by Mr Robinson, have been completed; the subject chosen being "The Anatomy and Pathology of Caries." The conditions have been published through the usual channels. Mr Somerset Tibbs has offered an additional prize of Ten Guineas for the second best Essay on the same subject; an act of praiseworthy liberality, which it is believed will have the effect of inducing an additional number of competitors to enter the lists.

Some of the original Members of the College, including Practitioners of great experience, having suggested to the Council the importance of applying without delay for a Charter of Incorporation, the subject would seem to demand a notice in this Report. The Council are fully alive to the impulse which the possession of a Charter would give to the cause; and the necessary application would have been made ere this, but for the fact that there is every reason to suppose that the application would be opposed by a combination which, they believe, will become weaker and weaker as the progress of time reveals the excellence of the principle of independent action upon which the College is founded and has existed despite every obstacle.

The tenancy of the College expired in September last, but the premises having been redecorated and adapted to the requirements for carrying on the various departments of the College, they have been taken by the Council on lease for a term of years—an arrangement which appears to have met with approval by all concerned.

In conclusion, the Council congratulate the Members on the position occupied by the College; and they would impress upon them the importance of helping actively to extend its influence, and so to hasten the time when, in the College, a Chartered Institution shall be secured to and governed by the Dentists of England.

To attain this end will be the continued endeavour and aim of the Council, relying on the co-operation of all friends of Professional progress.

Signed by order and on behalf of the Council.

GEORGE WAITE, President.
S. L. RYMER, } Hon. Secs.
A. HOCKLEY, }

The PRESIDENT, in moving the adoption of the Report, dwelt at some length on the arduous nature of the duties of the Council during the preceding twelve months. These duties had been carried on with energy, as the Report just read would prove: and, indeed, had energy been wanting, the College could not have been in the proud position it at present occupied. The opposition of the opponent of the Institution had been completely abortive, and he had full confidence in the ultimate triumph of the true principle upon which the College was established.

Mr FINZI had much pleasure in seconding the adoption of the Report, which was thereupon received and adopted unanimously.

Mr JAMES ROBINSON, the Treasurer, said that it now became his duty to read the statement of accounts. The expenses of the year had been unusually heavy, owing, in a large measure, to those connected with the Counter-protest and the Medical Declaration alluded to in the Report of the Council: nevertheless, he was happy to inform the Meeting that this vindication of the position occupied by the College had not absorbed all its funds, as he had still a handsome balance in hand after discharging all liabilities. He would, however, impress upon the members, and especially upon gentlemen from the provinces, the importance of exerting their influence in furtherance of the cause of independent action represented by the College.

Mr ROBINSON proceeded to read his financial statement, when it appeared that the total receipts, including the balance of last year, had been £547 2s. 9d., and the expenditure £487 9s. 9d., leaving a balance of £59 13s.

Mr VIDLER moved and Mr STODDART (the Auditors) seconded that the Treasurer's accounts do pass.

Mr HAYMAN (Bristol) said, whilst the motion was before the Meeting he would take the opportunity of saying, in reference to the observations of the Treasurer, that the country members felt very considerable interest in the progress of this College, and which was to some extent evinced by the attendance of himself and others from long distances. He had frequently corresponded with Mr Rymer on the subject, and he felt persuaded that a frequent communication between the executive in London and the provincial members was likely to be attended with the best results: he would therefore hope, that in case it should be considered desirable to practise economy this year in consequence of last year's extraordinary expenditure, no diminution would be made in regard to reports of College proceedings forwarded to the members. He quite agreed with Mr Robinson that it was the duty of Dentists generally to support their College, and this they should do by becoming members rather than by any other means.

After some discussion, the motion was put from the Chair and carried unanimously.

Dr Purland (Librarian and Curator) in presenting his Annual Report of the department entrusted to his charge, congratulated the Members of the College upon the satisfactory state of its political existence, after the ordeal it had passed through during the year 1860. The absolute necessity for an independent Dental College was brought before them daily, and it only required a continuance of combined action to perpetuate an Institution that must eventually be the rallying-point of the Profession. No great enterprise was ever carried out without opposition and difficulty, and it was in the nature of things that the College of Dentists should not be exempt; but perseverance would, in time, overcome every evil. They were, doubtless, aware that the Council had recently added a Reading-room for the use of Members, and he had the gratification of announcing the following list of books which had been deposited by gentlemen connected with the College. He wished it to be clearly understood that Members were not expected to *give* in every case: if they would only *lend*, they would do much good. It may be that Members have a few books they may not wish to part with: in that case, they can *deposit* them, subject to withdrawal on demand, and they may be assured they will be taken care of.

Mr Waite.—Bell on Wounds.—Buffon's Natural History.—Combe on the Constitution of Man.—Richerand's Elements of Physiology.—Waite's Dentist's Manual.—Waite on the Gums.

Mr Rymer.—Allarton on the Mysteries of Medical Life.—American Journal of Dental Science, 2 vols.—Pharmaceutical Journal, vol. 1.—Ramsbotham's Obstetric Surgery.—Tanner's Manual of Clinical Medicine.

Mr Hockley.—Harris's Dictionary of Dental Surgery.—Harris's Principles of Dental Surgery.—Hurlock on Dentition.—Nasmyth's Researches on the Teeth and Epithelium.—Richardson's Lectures on the Teeth.—Tomes's Dental Physiology and Surgery.—Piggott's Dental Chemistry.

Mr Perkins.—Clark (Andrew) on the Teeth.—Keocker on the Teeth and Jaws.

Mr Vidler.—Bell on the Teeth.—Fox on the Teeth.

Mr Finzi.—Hunter on the Teeth.

Dr Richardson.—Richardson on the Coagulation of the Blood.

Mr Spencer Wells, F.R.C.S.—British and Foreign Medico-Chirurgical Review.—Dublin Quarterly Journal, 55-6-7-8.—Edinburgh Medical Journal, 56-7-8-9-60.—London and Provincial Journal, 1860.—Liverpool Medico-Chirurgical Journal, 1857-8.—Midland Quarterly Journal of Medical Science, Jan. 1858.—North American Chirurgical Review, vols. 4 and 5, 1860.

Mr Dubois.—Hayward's Conversations on the Teeth.—De Chemant on Mineral Teeth.—Lefonta on the Practice of Dentistry.—Petitjean's Advice to Mothers.—Cowdell on Pestilential Cholera (from the Author).

Dr Purland.—Cullen's Surgeon's Practical Guide.—Disnett's Surgeon's Vade-Mecum.—Wilson (Erasmus), Anatomist's Vade-Mecum.—Hooper's Anatomist's Vade-Mecum.—London Surgical Pocket-book.—Hooper's Physician's Vade-Mecum, by Guy.—Steggall's Manual of the College of Surgeons.—Mayo's Physiology.—Elliotson's Physiology.—Grant's Comparative Anatomy.—Gregory's Elements of the Theory and Practice of Medicine.—Phillips's Translation of the Pharmacopœia.—Thomson's (Todd), London Dispensatory.—Hall's (Marshall), Researches relative to the Morbid and Curative Effects of the Loss of Blood.—Cooper's Dictionary of Practical Surgery.—Hoblyn's Manual of Chemistry.—Freckleton's Outlines of General Pathology.

Dental Review for 1860 (from the Proprietors).

Taft's Operative Dentistry (by purchase).

The Museum has received numerous additions through the kindness of the Members, and to Mr Hulme, for his valuable assistance in arranging and depositing some rare specimens of dental pathology, is due the highest praise.

Mr Pratt has presented a pair of Spring Forceps, and Mr Dobie two casts of Deficiencies, which will be remarked upon at the next Monthly Meeting.

Messrs Williams, Vidler, Campbell, and others have contributed numerous specimens, of which, as they now have been deposited for some time in the Museum, it is unnecessary to read a separate list on the present occasion.

Mr Porter proposed and Mr Williams seconded that the Report of the Librarian and Curator be received. Carried unanimously.

The President announced that the following gentlemen had been elected as Council and Officers for the year ensuing—viz. :—

President.—George Waite, Esq., M.R.C.S.

Vice-Presidents.—J. Horne, Esq., Glasgow; W. Imrie, Esq.; Norman King, Esq., Exeter; J. Merryweather, Esq., M.R.C.S.; J. Robinson, Esq., D.D.S.; Somerset Tibbs, Esq., Cheltenham; J. E. Rose, Esq., Liverpool.

Treasurer.—J. Robinson, Esq.

Council.—E. Bevers, Esq., Oxford; D. J. Brenneis, Esq.; W. L. Canton, Esq.; R. T. Hulme, Esq., M.R.C.S., F.L.S.; H. T. Kempton, Esq.; W. Perkins, Esq.; J. C. Smith, Esq., Chatham; G. Williams; W. R. Wood, Esq., Brighton.

Honorary Secretaries.—S. L. Rymer, Esq., and A. Hockley, Esq.

Registrar.—F. Weiss, Esq.

Librarian and Curator.—T. Purland, Esq., M.A., Ph.D.

Mr Finzi considered that a debt of gratitude was due to the Officers and Council for the able and satisfactory manner in which the College had been conducted during the year just elapsed, and he moved with much pleasure a cordial vote of thanks to the President, Vice-Presidents, Council, Treasurer, and other Officers, for their valuable services.

Mr Hayman (Bristol) seconded the motion, which was carried by acclamation.

The compliment having been duly responded to, and a vote of thanks, proposed by Mr LITTLE (Bristol), and seconded by Mr WILLIAMS, accorded to the President for his able conduct in the chair, the Meeting adjourned.

Tea and coffee were provided in an adjoining apartment, to which the Members were invited at the conclusion of the business, thus bringing agreeably to a close the most gratifying annual meeting held since the College was organised.

AT Meetings of the Court of Examiners of the College of Dentists, held on the evenings of the 17th and 25th ult., the following gentlemen were admitted Members by Examination: John Brock, Berners street, Oxford street; William Runting, South Audley street, Grosvenor square; George Wayling, Bury St Edmond's; and Thomas P. Payne, Southampton.

CERTIFICATE OF MEMBERSHIP.—The following are the names of gentlemen to whom Certificates of Membership have been granted since the publication of the List of Members in our last number:

Brock, John, Berners street, Oxford street (by Examination, Jan. 17).
Faulkner, Henry, Keppel street, Russell square.
Gibbs, Frederick, Pentonville.
Payne, Thomas P., Southampton (by Examination, Jan. 25).
Runting, William, South Audley street, Grosvenor square (by Examination, Jan. 17).
Shiels, William James, Cork.
Smart, John Sherard, Bristol.
Stoddart, Charles, Connaught terrace, Edgware road.
Thomson, Francis Hay, M.D., Glasgow.
Tweed, Robert, Colchester.
Wayling, George, Bury St Edmond's (by Examination, Jan. 17).

At Meetings of the Council held on the evenings of January 2nd and 15th, the following gentlemen were elected Members and Associates of the College:

Members.—Messrs T. Gibbs, Pentonville, and Robert Tweed, Colchester.

Associates —Messrs W. Bradley, Woburn place, Russell square, and J. Jackson, High street, Camden Town.

MR HULME'S LECTURES.—On the evening of Tuesday, January 8th, Mr Hulme delivered the first of a Course of three Lectures on "Diseases of the Dental Periosteum." The Lecture commenced by comparing the physiological condition of the tooth with that of one of the long bones of the body. He then described the distribution and peculiar structure of the periosteum, and especially referred to the presence of special cells, which, under certain conditions, are found to take on an excessive development and form the basis of tumours occasionally found attached to the fangs of teeth. The Lecturer concluded with a full description of the causes, symptoms, and treatment of acute periostitis, and some of the more serious resnlts which it occasionally gives rise to.

The Second Lecture was delivered on Tuesday, January 29th. The subject of Inflammation was continued, and the condition it assumes in the chronic state described. The effects of Gout, Rheumatism, Syphilis, and Mercury were next illustrated by reference to cases. The remainder of the Lecture was occupied with a description of the various forms of tumours which appear as morbid growths of the periosteum.

The Third and concluding Lecture of the Course will be delivered on Tuesday, the 12th inst. Subject, Exostosis.

ODONTOLOGICAL SOCIETY OF LONDON.

ANNUAL GENERAL MEETING.

THE Odontological Society held its Anniversary Meeting on the evening of January 7th; W. A. HARRISON, Esq., President, in the chair.

The following were elected as Officers and Councillors for the ensuing year:

President.—W. M. Bigg, Esq.

Vice-Presidents.—John Tomes, Esq.; S. Cartwright, Jun., Esq.; Edwin Saunders, Esq.; John Martin, Esq., Portsmouth; T. G. Palmer, Esq., Cheltenham; Robert Brookhouse, Esq., Manchester.

Treasurer.—Arnold Rogers, Esq.

Honorary Secretaries.—For Foreign Correspondence—Thomas A. Rogers, Esq. *Ordinary*—Alfred Canton, Esq.; G. A. Ibbetson, Esq.

Council.—J. B. Fletcher, Esq.; T. Underwood, Esq.; H. J. Barrett, Esq.; W. A. N. Cattlin, Esq.; J. R. Mummery, Esq.; Samuel Maclean, Esq.; John Drew, Esq.; Isaac Sheffield, Esq.; Alfred Coleman, Esq.; T. R. M. English, Esq., Birmingham; W. K. Bridgeman, Esq., Norwich; George Parkinson, Esq., Bath; H. A. Dewar, Esq., Aberdeen; R. H. Moore, Esq., Dublin.

The TREASURER stated that the total receipts of the year had been 254*l.* 2s., and the expenditure 161*l.* 14s. 3d., the balance in hand being 407*l.* 17s. 6d.

A vote of thanks was proposed to the retiring Treasurer, Mr Edwin Saunders, and carried by acclamation.

Mr SAUNDERS then presented the Society with a volume of Photographs of its Members, which he had been collecting for some months. In doing so, he observed, that in June last he had addressed a circular to every Member of the Society, the replies to which furnished another illustration of the proverb ‘Quot homines, tot sententiæ.’ From the great majority he had received favourable and courteous replies, as would naturally be expected from a body of gentlemen. Some, however, from whom better things might have been expected, had not deigned to notice his communication, and he was in ignorance at that moment whether they intended to comply or not with his request. Some had pleaded diffidence, which he had generally succeeded in removing; one inquired if he had the intention of playing the detective over the Society; and in one instance, and in one only, compliance with his request, he regretted to say, had been declined. On the whole, however, the correspondence which had arisen from the carrying out of the scheme had been the occasion of a display of cordiality and kind feeling which had been especially gratifying.

A special vote of thanks was passed to Mr Saunders for the volume of Photographs.

The special business of the Meeting being completed, the PRESIDENT delivered an Address, of which the following is an abstract:

He commenced by observing that he had no desire to plunge into the troubled sea of Dental politics further than was unavoidable. With reference to the Protest issued in the spring against the intended proceedings of the College of Dentists, he considered that it was right in itself, and had been productive of good.

The next subject alluded to was the formation of the Board of Examiners in Dental Surgery by the College of Surgeons, which the President regarded as one of the most important events of the year bearing upon the Dental Profession.

The next subject in order of time and importance was the opening of the London School of Dental Surgery in connection with the Hospital, one of the events in the history of the year they might all most honestly rejoice at.

"While upon this subject," observed the President, "I feel myself called upon to notice, and I have very great pleasure in doing so, the Dental School established by the promoters of the College of Dentists. That school was opened before the commencement of my year of office, and may not therefore be considered by some as coming fairly within the scope of these remarks; but although I am in no way connected with the College of Dentists, and feel bound in candour here to say that I regret many of the proceedings of its promoters, yet I feel also bound to say that I am by no means blind to the advantages to the Profession of some of its acts, and that among those of its acts that have my approbation is the formation of this school. I think the establishment of such a school good in itself—and I think it likely to do good by promoting emulation (I hope it will always be a generous one) between the two schools—for both of which I think there is room in this metropolis. Entertaining these feelings, I have felt it to be right here to allude to it, and to record my approbation of its establishment."

With regard to the trial of "Morrison *v.* Churchill," he considered the proprietors of the Journal in which the article appeared which led to the trial were entitled to their gratitude for the firmness they had displayed. It was to be regretted, perhaps, that Mr Morrison had had what seemed to be a triumph for a time; but he regarded it as a mere seeming triumph, and not as a real one. He thought the proprietors of the Journal ought to be indemnified for the expense to which they had been subjected by this trial, and was exceedingly anxious to see the movement which had been made for that purpose carried out successfully. He congratulated the Members on the excellent attendance there had been at the meetings during the year just ended, and the admirable papers read and communications which had been received from various Members. They had every reason to congratulate themselves upon the success and prosperity of the Society. A Committee had been formed for the purpose of arranging the papers which had been read before the Society since the publication of the last volume, with a view to the publication of another.

The PRESIDENT concluded his address by returning his personal thanks for the support which he had received during his year of office, and trusted that he had so regulated the Meetings as to give satisfaction to all, and to have promoted the objects and interests of the Society. (Applause).

A vote of thanks to the President was carried unanimously; after which Mr Saunders rose and expressed a hope that the retiring President would follow the example of his predecessors and favour them with his "counterfeit presentment."

The President said he should feel it a high compliment to have his portrait suspended in the room by the side of those he saw around him; and as such appeared to be their wish, he would take an early opportunity to get himself transferred to canvas and placed in form at the disposal of the Society. (Cheers.)

The Society then adjourned.

METROPOLITAN SCHOOL OF DENTAL SCIENCE.

Examination at the Comparative Anatomy Class, Jan. 15, 1861. —The Course of Lectures of the present Session embraced, for the most part, a consideration of the structure of the lower forms of animal life included under the divisions *Protozoa*, *Radiata*, and *Articulata*. By thus varying the subject-matter of the lectures, a large proportion of those students who attended the course on "*Mammalia*," delivered during the previous year, also attended this session. The attendance was also characterised by the same regularity and diligence. The Competitive Examination just concluded was entirely *oral*, which thus afforded the introduction of a more extended series of questions. *Eight* gentlemen came forward in competition, and the character of the answers given by *six* of their number proved highly creditable. Thirty-four questions of the value of five marks each were put to each student, the total value of all the questions, if answered correctly, being 170 marks. The result was as follows:

	Marks.	
Mr Cox	162	Prize.
Mr Henry	129	Certificates of Honour.
Mr Vernon	86	
Mr Bradley	84	
Mr Ross	66	Commended.
Mr Hoole	58	

The character of the questions may be gathered from the following selected examples, which were in nearly all instances correctly answered:

1, 2, 3. What do you understand by the Geographic, Geologic, and Bathymetric distribution of animal life?

4. Describe the skeleton of a common Sponge.

5, 6, 7. By what means are the movements of the (Discophorous, Ctenophorous, and Siphonophorous) Jelly-fishes severally regulated?

8, 9. To what set of structures is the term "Aristotle's Lantern" applied? Describe, in particular, the teeth of this remarkable dental apparatus.

10. What do you understand by "alternate generation?"

11. In what respects do the young of the Guinea-worm (Dracunculus) differ from their parent?

12, 13. How does man become infested with *Tænia solium*? How is the nutrition of this Entozoon provided for?

14. Describe the dental apparatus of the medicinal Leech?

15. What is there peculiar about the teeth of the common Lobster and its allies?

T. Spencer Cobbold, M.D., F.L.S.,
Lecturer and Examiner.

SOCIETY OF GERMAN DENTISTS.

ANNUAL GENERAL MEETING.

(Translated from 'Der Zanharst' (The Dentist), Berlin, by Mr G. Henry, Jun., M.C.D.E.)

The Second Annual Meeting of the Society of German Dentists was held at Arnim's Hotel, Berlin, on the 6th, 7th, and 8th of September, 1860, under the Presidency of Hr. G. Oenicke, Court Dentist, Vice-President of the Society; Hr. C. Schmedicke officiating as Secretary. There was a good attendance of Members of the Society, including a few new Members elected since the last Annual Meeting.

The proceedings commenced on the afternoon of the 6th with an appropriate Address from the President, at the conclusion of which he begged the earnest attention of the Members present to the various subjects to be brought forward.

The Secretary then read several letters from Members of the Society, regretting their inability to attend the Meeting. Communications were also read from Hr. L v. Baumgarten, Apothecary, Regensburg, calling attention to his improved tooth-cement, and informing them that Hr. Th. Granischstetten, Court Dentist at Regensburg, would read a paper on the subject before the Assembly—from Hr. C. Meyer, of Barmen, who forwarded for inspection two lower incisor teeth, enveloped in an unusually thick incrustation of tartar, which he had removed from the mouth of a young lady. Hr. Meyer also recommends to the notice of the Profession a new stopping cement, consisting of three parts of oxide of zinc and one part of the finest pulverised glass, and another, composed of fifty parts of chloride of zinc and one part of borax. HH. Richard Fürth and Co., Dental Depôt at Hamburgh, sent for exhibition their apparatus for packing the flasks with rubber, and several other Dental requisites for the surgery and workroom. Hr. M. Meyer, Court Dentist and Honorary Secretary to the Association at Baden, presented to the Society a Treatise on Vulcanite, by Dr C. Langsdorff, of Cleveland, Ohio, North America, together with specimens of artificial teeth vulcanised at different degrees of heat.

"The Vulcanite Process" being first in the order of proceedings for discussion by the Society, the President thought it appropriate that the subject should be introduced by the reading of the above treatise. This treatise, entitled 'The History of Vulcanite, and its Adaptation as a Base for Artificial Mineral Teeth,' was accordingly read by the Secretary, and was listened to with considerable attention. The Author divided his subject into two parts, Historical and Practical; the first treating on the origin of vulcanite, with a description of the substance from its earliest application to various useful purposes, prior to its use as a base for artificial teeth—the difficulties with which the inventor had to contend, his achievements and final success. The second part treats of the arrangement of the teeth and plate; the formation of moulds; the operation of packing; the process of vulcanizing, cleaning, and polishing the vulcanite cases.

In the debate which followed, the question of the superiority of the method under consideration was almost exclusively discussed. Some of the speakers approved of vulcanite, others objected to it.

Hr. Nieff was of opinion that vulcanite was far better adapted for entire cases than for partial pieces with clasps, the latter not admitting of so good a finish as in metal.

Hr. Diedrich thought that clasps were scarcely necessary, as the vulcanite adheres readily without them when a correct bite is obtained. Further, a metallic plate never fits so accurately as one of vulcanite. He could only speak in favour of vulcanite.

Hr. Wahllaender, Jun., differed from the last speaker, and observed, in particular, that the necessary alterations could not always be accomplished in a vulcanite piece.

Hr. Schmidt objected to vulcanite, because repairs could only be executed with great loss of time, and because the thick, broad plates deprived patients of the sense of taste.

The President explained how the thickness of a vulcanite plate facilitated mastication when the side teeth are wanting, and mentioned a case in point, where an upper piece had been worn for a long time, on which small pits had been made for the reception of the lower front teeth.

Hr. Schmedicke, although a warm defender of vulcanite, regretted that it was used as a means of supplanting every other material; he believed it to be an admirable substitute for bone, but gold could in nowise be declared unnecessary. Where vulcanite is applicable, it is an excellent material.

As the hour was far advanced, and an opportunity would present itself for a revival of this discussion, the Meeting adjourned.

The Second Day's Sitting was opened with the reading and confirmation of the minutes of the previous Meeting, after which the following question was proposed for consideration: "Have any advantages been obtained in Germany by the Cheoplastic Method—and what?"

From the discussion which followed, and in which HH. Schmedicke, Block, and Diedrich took part, it appeared that in Germany only one Dentist, Hr. Fincke, of Coblentz, was known to have tried this method, and his experiments seemed to have been very successful. The observations of the speakers were consequently limited to a theoretical view of the subject.

The second question for consideration, "Which is the best cement for stopping teeth recommended during the last few years?" afforded an opportunity for the reading of Hr. L. v. Baumgarten's paper, in which he described the properties of his improved (Sorelschen) cement, and proposed to the Meeting that he would, on certain conditions, hand over the formula to the German Dentists.

Hr. Granichstetten having read the paper, added that he had stopped about a thousand teeth with this cement since November of the previous year, with the most favourable results. In some few cases he had used it for building up artificial crowns, and here its adhesive property was especially well shown; but to accomplish this, all moisture must be carefully excluded from the cavity, and this operation is facilitated by the use of the inventor's drying preparations. He could not forbear to recommend the cement in question most warmly, no other having answered his expectations so well: at the same time, he wished it to be understood that he had only a scientific interest in the matter.

Several Members joined in the discussion which ensued. Another stopping material was alluded to by Hr. Nieff, which he recommended especially for large cavities. The latter was prepared by Hr. Schmidt, of Hanover.

It was not deemed advisable by the Meeting to accept the offer made in Hr. Baumgarten's paper, and it was suggested that the Author should introduce his preparation to the Profession in any other way that he might think fit.

"Do we obtain as favourable results with the filling-material known under the name of crystal-gold as with the leaf-gold?" was the next subject for discussion, but, owing to the lateness of the hour, and several Members having left the Hall, the remarks on the subject were very limited. Hr. Franz said that one of the Members was in the habit of using crystal-gold for completing fillings commenced with the ordinary gold-foil, because it adhered so readily.

Hr. BLOCK then exhibited a number of specimens of vulcanite pieces, some with enamelled gums, and also a piece constructed of amber. He also recommended, in cases where gold-bands surrounded sensitive teeth, that they should be covered with vulcanite, which might be hardened in the ordinary way. The teeth were no longer affected by the bands, and he believed the experiment to be a very useful one.

At the conclusion of the sitting, HH. Dr v. Langsdorff, of Cleveland, and Moe, of Norway, were unanimously elected Corresponding Members.

THIRD DAY'S SITTING.—The minutes of the preceding Meetings having been read and confirmed Hr. FRICKE, senior, communicated a few results of his experience, which called in question the soundness and durability of vulcanite bases. The speaker alluded to a case in which a piece was fractured after being worn but a few days, although carefully constructed, and that strictly in accordance with the best method known.

Hr. G. A. OENICKE was then re-elected President.

The attention of the Meeting was now directed to the debate on the best means of preventing Charlatanism, or unqualified Dentists from encroaching on the rights of the Profession, in which the majority of the Members present took part, and it was ultimately resolved to petition the different Courts, that the existing legal powers in reference to Medical puffing should be strictly enforced. A Committee of Berlin Dentists, consisting of HH. Köning, Schmidt, and Wahllaender, jun., was formed to take the necessary steps, and, moreover, to issue a prohibition against the insertion of advertisements in the public papers, or the exhibition of placards, as emanating from persons not recognised by the Profession.

The Report of the transactions of the Society for the past year, including a list of contributions from Members and an account of the expenses, was then submitted to the Meeting for approval. Hr. Nieff was requested to examine the accounts, and having done so, he stated they were perfectly correct. The Report was adopted in its entirety.

The PRESIDENT then introduced, for the inspection of the assembly, an apparatus for packing flasks with rubber, a large assortment of mineral wheels and files, and three specimens of forceps for the removal of fractured pins from pivoted roots of teeth, kindly sent from the firm of HH. Fürth and Co.

The apparatus above mentioned enables the workman to remove the modelling wax from the flask by dissolving it out with boiling water, and to introduce the rubber in a fluid state. This apparatus, as also the artificial whetstones, files, &c., met with deserved approbation.

It was then arranged that the form of Diploma for Ordinary, Corresponding, and Honorary Members of the Society, as also the framing and printing of the laws, should be entrusted to the Committee.

Berlin was again determined upon for the next Meeting of the Association.

Towards the end of the third sitting, the PRESIDENT acknowledged the kind attention evinced by all throughout the proceedings, and thanked the Members for their assistance and forbearance in the exercise of his office. This terminated the proceedings, and the Members then adjourned to a friendly repast, which afforded an opportunity for numerous toasts. The party was kept up to a late hour with great humour and animation.

CORRESPONDENCE.

TO THE EDITOR OF THE 'DENTAL REVIEW.'

SIR,—I beg to thank you for having kindly given an explanation of Dr Richardson's meaning with reference to the point I mentioned in my letter last month. This view of the case is no doubt the correct one, if, after death under the circumstances in question, the right cavities of the heart are found congested, while those on the left, together with the pulmonary arteries, are empty; but there was nothing in the original statement which would induce us to suppose that this was what the Lecturer intended to express,—the actual words of the passage under consideration leading us to infer that the right side alone of the heart was exposed to the agency of the poison, and that the left side ceased to act only when deprived of the supply of blood by the arrest of action on the right side. If, therefore, the Lecturer's words were correctly reported, it is unfortunate that he should have so expressed himself, and that he did not state that post-mortem examination revealed to us the fact of the right side of the heart being the first to succumb to the noxious influence, although both sides were alike exposed to it through the blood circulating in the coronary vessels.

I have the honour to be, Sir, your obedient servant,

HENRY LONG JACOB, M.R.C.S.

Bridgwater, January 15, 1861.

TO THE EDITOR OF THE 'DENTAL REVIEW.'

SIR,—It is said that every evil has its antidote, and there is no good which has not some drawback accompanying it. The liberty of the press has unquestionably secured innumerable blessings to this country; and if the editorship of public journals could only have been confined to just and honourable men, these benefits would have been increased tenfold. Amidst the dissensions which have disturbed the Dental Profession in England, one of the greatest possible misfortunes which could have happened to the cause of peace and union has been the manner in which the editorship of the 'British Journal of Dental Science' has been conducted since it fell into the hands of its present proprietors.

It is an axiom in the practice of certain lawyers, that when you have no case you must abuse your adversary: in other words, you must endeavour to distract the minds of the judge and the jury from the real question before them, and so prejudice them, not against the cause at issue, but against the parties who represent that cause, that they are led to condemn the one on account of their feelings towards the other. It is precisely this line of conduct which is pursued by the Editor of the Journal in question. For a short time there has been some slight cessation in the foul personal abuse with which he has been wont to assail the Members of the College of Dentists; but, "as a dog returns to its vomit," so the Editor of the 'British Journal,' unable to restrain the natural propensities of a disappointed and malignant spirit, falls back in the present number into his old style of personal slander.

Let your readers judge for themselves, by the following extract, whether the character of the Editor is unjustly represented:

> If any other published list of individuals who designate themselves "Dentists" be scrutinised with ordinary care, it will be found to consist (after excluding chemists, barbers, blacksmiths, photographers, &c.) almost entirely of *ci-devant* workmen—good mechanics, it may be, but, with their present attainments, unable to hold the position of professional men—and of advertising dentists.

A more atrocious calumny was never uttered; but even supposing it were true, I would ask, does this, in the slightest degree, affect the question at issue—viz., Whether there should be an independent Dental Profession, or whether it should be a mere fragment of the College of Surgeons?

Does it say anything for or against the views advocated by the 'British Journal,' when it is stated that a leading member of the Odontological Society formerly distributed handbills? What, I would ask, is the meaning of the outcry against the Chemist practising as a Dentist? Was not Mr Arnold Rogers, one of the Examiners in Dental Surgery, originally a Chemist? The time must come when the candidate for the Certificate in Dentistry must obtain it by a positive examination, and by complying with the curriculum put forth by the College of Surgeons. When that is the case, the College of Surgeons will have no more power of preventing such persons from practising as Chemists than they have of preventing the Surgeon from doing so, or as they have done at the present time with regard to one who now holds the Dental Certificate.

Would it be supposed that any one holding this much-vaunted Certificate would condescend to keep a Chemist's shop?—that he would issue handbills to inform the public that he prepares compounds according to the several Pharmacopœias of Great Britain, America, and other countries; that there you can supply yourself with enema apparatus, india-rubber bottles, catheters, syringes, elastic lace stockings, bandages, respirators, pessaries, suspenders, sponge-bags, perfumery, spongio-piline, tooth and nail brushes, tongue-scrapers, toothpicks, wax vestas, infants' feeding-bottles, nipple shields and shells, breast pipes and pumps, calves' and india-rubber teats, Turkey sponge, Windsor soap, violet powder, infants' food, and a variety of articles for the use of the nursery? Added to this, the honourable gentleman who holds the Certificate in Dentistry of the Royal College of Surgeons of England has on hand 5,000 patent medicines and miscellaneous articles. Amongst the former, are Dr

Blundell's Pennyroyal Female Pills, to be had in small boxes at 7½d., or post free for nine stamps; Old Fletcher's Life Pills, and Dr Cobb's Samaritan Oil. Lastly,—and it is probably this department of the miscellaneous collection that qualified this gentleman for the Dental Certificate,—he has

AN INSTANT CURE FOR TOOTHACHE;

MAGIC DROPS,

by the use of which many thousands of teeth have been preserved from extraction; a soothing powder, which requires only to be placed upon the tongue, and is the most safe, agreeable, and efficacious medicine ever introduced for the diseases attending infancy and childhood: while

BELL'S ENAMEL,

FOR STOPPING DECAYED TEETH,

rendering them sound, painless, and useful through life for mastication and ornament, is to be had for a shilling a box. 'Think of that, Master Brook,' and ask the worthy President of the Linnæan Society whether he is not proud of this illustrious Member of the Dental Profession, whom he has assisted to place above the barbers, blacksmiths, and other Chemists of the United Kingdom? Why, the man is the very Autolycus of Dentists, and has cures as wonderful as his namesake's ballad of 'How an usurer's wife was brought to bed with twenty money-bags at a burden.' Yet these are the men, forsooth, who hold themselves so high, and congratulate themselves that they are not as other Dentists!

From personal knowledge, I can assert that the Council of the College of Dentists take every possible precaution against admitting either Chemists or advertising Dentists as Members, and I do not believe that three instances can be mentioned where this is the case. In respect to the question of advertisements, I would take this opportunity of reminding the Members of the College of the difficulty which the Council have in dealing with these cases. Instances have come before them of men who advertise, placing the initial letters of the College after their name, who have never belonged to it; in other cases, there have been two Dentists of the same name, one a Member of the College, the other not, the latter advertising. In this case the one has been mistaken for the other. It may be, that here and there, in distant parts of the country, one or two advertisers may have formerly gained admission to the College of Dentists. I do not think they will be able to do so under its present regulations. If such were the case, it would be as unfair to charge the Executive of the College with conniving at the admission of such members, or in any way countenancing their proceedings, as it would be to render the Council of the College of Surgeons responsible for the obnoxious advertisements of Messrs Brodie, and the whole clique of practitioners who prey upon the sins and weakness of mankind, and who daily and openly, in the public press, avow that they are Members of the Royal College of Surgeons by placing the letters M.R.C.S. after their names.

It is with unfeigned pleasure that I turn from this disgraceful Editorial production to the recent Address of the President of the Odontological Society, which is recorded in another part of the same Journal. I am a perfect stranger to that gentleman, but I have a gratification in publicly thanking him for the liberal and courteous manner in which he has spoken of the proceedings of the College of Dentists. All this is perfectly consistent with the avowal of his firm adherence to the acts and principles of the party he has espoused, and renders it of far greater force than would a whole volume of the vulgar bullying which emanates from the pen of the Editor. The former engenders respect and a regret that there appears to be no means of reconciliation between the two parties, while the latter raises only a spirit of animosity and a desire to keep aloof from all communication with such an unscrupulous opponent. For my own part, I should as carefully avoid any intercourse with those who are regarded in public opinion as the proprietors of the 'British Journal of Dental Science,' as I should with any of those who are termed the "dangerous classes of the community."

I remain, Sir, your obedient servant,
A MEMBER OF THE COLLEGE OF DENTISTS.

MISCELLANEOUS.

SOUTH HANTS INFIRMARY—ILLIBERAL INTERFERENCE.—A Dentist is to be appointed to the Infirmary at Southampton. There are four respectable Dentists in practice in the town; but a law has been made which excludes three of these gentlemen from holding the appointment. It has been ruled that no one can hold the appointment who has not obtained the Dental Licence of the College of Surgeons. As only one Dentist in the town has obtained the diploma, the other Dentists are practically excluded even from becoming candidates. This is an interference with liberty of choice which we should think it unlikely the Governors will submit to. It is unjust in every way. The Dental Licence of the College of Surgeons has only recently been established, yet it is used as a test of fitness for gentlemen who were in practice many years before it was thought of. Again, many Dentists object to it on principle. They do not wish to become a dependent section of the College of Surgeons, but prefer to belong to an independent College of their own. The Medical Profession also—if we may judge by a memorial signed by some *three thousand* Practitioners—would much rather see the Dentists Members of a College as distinct from the College of Surgeons as the College of Engineers, or the Institute of Actuaries, or the Royal Academy of Arts, than half-acknowledged Members of a College which gives them a title to assume the prefix or affix of SURGEON to their true title. Surely the Medical Officers of the South Hants Infirmary could have had nothing to do with this most unjust and impolitic regulation.—'Medical Times and Gazette.'

CHLOROFORM LINIMENT FOR DENTAL PURPOSES.—Take the white of an egg, and add an equal bulk of chloroform: let it digest four hours at an ordinary temperature, when it is fit for use. Apply to the gum, immediately above the aching tooth, by saturating a piece of lint, one-half inch in length by one-fourth in width. Upon this place a second piece of lint, larger than the first, to protect the lips, which must be allowed to carefully fall upon the two, so as they may retain their place. We have found this an invaluable relief for such disturbances as are not dependent upon fully-developed inflammation, such as neuralgic disturbances and the first stages of periostitis. A more powerful liniment can be made, by taking one part of white of egg and four parts of chloroform. Put them in a bottle, and plunge it in a water-bath, at a temperature of from 120° to 140° Fahrenheit. Gelatinisation takes place in four minutes. This preparation is to be rubbed on any painful part, when great relief will be experienced. The slow cauterisation it produces, and the protection of the part from the atmosphere, render it a very powerful counter-irritant, as applied to the gums in the manner described. We have found it in many cases highly serviceable, and recommend it to more general use. The cold preparation is, perhaps, the best and easiest made; and when a decided effort is required, it should be repeatedly used.—'American Journal of Dental Science.'

REMEDY FOR BAD BREATH.—Chlorate of potash, two ounces; sweetened water, four ounces. A teaspoonful to be taken a few hours after breakfast, and the mouth washed occasionally with it. This trouble principally arises from a diseased condition of the gums, often produced by secretion of calculi around the necks of the teeth. When dependent upon this cause, all correcting agents will be but temporary. The only cure is the removal of all accumulations, and restoring the gums to health by frequent friction, as from a brush with astringent washes containing subborate of soda.—'American Journal of Dental Science.'

FANG-FILLING.—Professor Watt reports several cases in which the nerves of the teeth had been extirpated, and the crowns filled after his peculiar method. He claims satisfactory success. Every practitioner was compelled to allow the dead pulp to remain in a tooth before fang-filling was introduced, and success frequently attended his operations. It was found, however, from many failures, injudicious practice; and the nerve was extirpated, and its place partially occupied with substances used in filling—creasote being used to purify and produce cicatrization. Greater success attended this; it was carried into a systematic operation, and, when well done, is most generally highly successful. Professor Watt recommends filling the crown only with gold, after treating the pulp cavity and fang with creasote.—'American Journal of Dental Science.'

MORRISON *v.* CHURCHILL.—It will be remembered that, some time back, Mr Morrison obtained a verdict against the 'British Journal of Dental Science' in an action for slander, the defendant having to pay the whole of the expenses of the action, in addition to 100*l.* penalty. On the 1st inst. the defendant, as representing the Journal, appealed to the Court of Session, Edinburgh, against the large amount of the expenses incurred by the plaintiff, but without effect, as the Lords of Session ruled that the expenses were not excessive, although the auditor had expressed an opinion as to the largeness of the amount, and the defendant was further required to pay the expenses of this appeal. Thus, the entire amount of expense in this case cannot be much less than 1,000*l.*

NOTICES TO READERS AND CORRESPONDENTS.

All communications intended for insertion in this Journal must be authenticated by the name and address of the writer, not necessarily for publication, but as a guarantee of good faith.

Contributors are requested to be so obliging as to write legibly, and on one side of the paper only.

All Communications intended for insertion, as well as Books for Review, &c., should be addressed to "The Editor," at the Publisher's, Mr H. BAILLIERE, 219 Regent street, W., NOT LATER THAN THE 15TH OF THE CURRENT MONTH.

Dr JACOBI'S Lectures on "Dentition and its Derangements" are unavoidably postponed to next month.

BOOKS RECEIVED IN EXCHANGE.

The Dental Cosmos for January.
The Dental Register of the West for January.
The London Medical Review for January.
The American Medical Times, Nos. 23 to No. 4, Vol. 2.

THE

DENTAL REVIEW.

MARCH, 1861.

THE NATURAL HISTORY OF THE HUMAN TEETH.

By JOHN HUNTER, F.R.S.

EDITED BY
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(Continued from page 58.)

DIGASTRICUS.

It is situated immediately under, and a little upon the inside of the Lower-Jaw, and outside of the Fauces, extending from the Mastoid Process to the Chin, nearly along the angle made by the Neck and Chin, or Face. (*c*) The name of this Muscle expresses its general shape, as it has two fleshy bellies, and of course a middle tendon. (*d*) Yet some of its anterior belly does not arise from the tendon of the posterior, but from the Fascia,

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(*c*) [*Vide* Plate 3, E F.]

(*d*) [The name "digastricus" is not equally applicable to this muscle in all the Mammalia in which it is found. In the Apes, as in Man, it consists of two bellies, united by a middle tendon, which passes through the stylo-hyoid. In the Mandrill and Baboon the term in question might be applied to the posterior bellies of opposite sides, for their tendons unite in front of the os hyoides to form an arch, from the convexity of which the two anterior *ventres*, which are contiguous the one to the other, take their origin by an aponeurotic expansion. By this arrangement the power of the muscle, as a depressor of the jaw, must be considerably augmented. Professor Vrolik states that in the Loris (Stenops) the structure of the digastricus points to a transition from the Quadrumanous type to the simple form which it takes in the Carnivora, there being only an indication of the intermediate tendon. In the Rodents (with the exception of the Rabbit), and in the Ruminants generally it is biventral. On the contrary, in the Carnivora, the Kangaroo, the Sloths, the Elephant, the Hog, the Hyrax, it is only a single-bellied muscle. Straus-Durckheim, however, describes it in the Cat as being interrupted a little behind the angle of the jaw by a tendinous intersection, which gives rise to new fleshy fibres. The which binds it to the Os Hyoides. These two fleshy bellies do not run in the same line, but form an angle, just where the tendon runs into the anterior belly; so that this tendon seems rather to belong to the posterior, which is the thickest and longest.

This Muscle arises from the Sulcus made by the inside of the Mastoid Process, and a ridge upon the Temporal Bone, where it is united with the Os Occipitis. (*e*) The extent of this origin is about an inch: it is fleshy upon its outer part, viz. that from the Mastoid Process, and tendinous on the inside from the ridge. From its origin it passes forwards, downwards, and a little inwards, much in the direction of the posterior edge of the Mammillary Process; and forms a round tendon first in its center and upper surface. This tendon passes on in the same direction; and when got near the Os Hyoides, it commonly perforates the anterior end of the Stylo-Hyoideus Muscle; and from the lower edge of this tendon, some fibres seem to go off, which degenerate into a kind of Fascia, that binds it to the Os Hyoides; and some of it goes across the lower part of the Mylo-Hyoidæus, and joins its fellow on the opposite side; binding the Os Hyoides by a kind of belt. At this part the tendon becomes a little broader, makes a turn upwards, inwards, and forwards, and gives origin to the anterior belly, which passes on in the same direction, to the lower part of the Chin, where it is inserted tendinous and fleshy, into a slight depression on the under, and a little on the posterior part of the Lower-Jaw, almost contiguous to its fellow. (*f*) Besides the attachment of the

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straight line pursued by the simple fleshy muscle in these animals, as compared with its deflected course in Man, is evidently conducive to more powerful and direct action in the abduction of the maxilla. According to Cuvier, the digastric is absent in the Ant-eaters and Armadillos, its place being supplied by a long and slender muscle which takes its origin from the sternum, and is inserted into the inferior border of the jaw.] (1)

(*e*) [It is observed by Tyson that in the Chimpanzee the digastric does not arise from the mastoid process of the temporal, as in Man, but from the occipital bone. He adds, "Drelincourt describes it (the digastricus) in Apes thus: Tendinem habet intermedium pollice longum, et gracilem, enascitur antem non ab apophyse Styloide, sed ab osse Basilari."] (2)

(*f*) [The surface for insertion of the digastric varies in position in Mammalia. In Carnivora it is attached for a varying distance to the middle tendon to the Os Hyoides, there is a ligamentous binding, which serves, in some measure, as a pulley. (*g*) This is more marked in some subjects than in others; and this depends on the strength of the tendinous expansion, which binds the tendon of the Digastricus to the Os Hyoides.

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(1) *Vide* Cuvier, op. cit., p. 91; Vrolik, Article Quadrumana, Todd's Cyclopædia of Anatomy; Straus-Durckheim, op. cit., p. 218.

(2) Orang Outang, sive Homo Sylvestris, or the Anatomy of a Pygmie, by E. Tyson, M.D., F.R.S., p. 86.

When we say that these parts are attached to the Os Hyoides, we do not mean that they can be traced quite into it, like some other tendons in the body; but the Os Hyoides seems to be the most fixt point of attachment. Very often we find two anterior bellies to each Muscle; the uncommon one, which is the smallest, does not pass to the Chin, but joins with a similar portion of the other side, in a middle tendon, which is often fixed to the Os Hyoides. At other times, we find such a portion on one side only; in which case it is commonly fixed to the middle tendon of the Mylo-Hyoidæus.

The use of these Muscles with regard to the Lower-Jaw, is principally to depress it; but according as one acts a little more forcibly than the other, it thereby gives the Jaw a small rotation; and becomes, in that respect, a kind of antagonist to the Pterygoidæus Externus. Besides depressing the Lower-Jaw, when we examine the dead body, they would appear to raise the Larynx. But although they have this effect, a proper attention to what happens in the living body, will probably shew, that their principal action is to depress the Lower-Jaw, and that they are the Muscles which are commonly employed for this purpose. Let a Finger be placed on the upper part of the Sterno-Mastoidæus Muscle, just behind the posterior edge of the Mastoid Process, about its middle, touching that edge a little with the finger; then depress the Lower-Jaw, and the posterior head of the Digastric will be felt to swell very considerably,

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inferior border of the horizontal ramus. In the Cat it is inserted, according to Cuvier, into the angle of the jaw. Straus-Durckheim, however, describes it as reaching the anterior half of the lower border. In the Rodents it is prolonged to the back part of the arch of the chin, into which it is fixed; in the Elephant it is attached to the posterior border of the maxilla; in the Horse the principal portion of the muscle is inserted into the angle; in the Ruminants it extends as far as the mid-length of the ramus.] (1)

(*g*) [The existence of an apparatus analogous to the pulley was denied by Monro primus (*vide infra*, note *h*). Many writers describe the tendon of the digastricus as passing through an aponeurotic sheath lined by a synovial membrane. Such a structure, although in some instances apparent enough, is by no means constant.

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(1) Cuvier; Straus-Durckheim, op. cit.

and so as to point out the direction of the Muscle. In this there can be no deception; for there is no other Muscle in this part that has the same direction; and those who are of opinion that the Digastric does not depress the Lower-Jaw, will more readily allow this, when they are told, that we find the same head of the Muscle act in deglutition; but not with a force equal to that which it exerts in depressing the Lower-Jaw. (*h*) Further, if the Sterno-Hyoidei, Sterno-Thyroidei, and Costo-Hyoidei, acting at the same time with the Mylo-Hyoidei, and Genio-Hyoidei, assisted in depressing the Jaw, the Os Hyoides,

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(*h*) [Hunter here probably refers to a paper by Alexander Monro primus on the Articulation Muscles and Luxation of the lower jaw, which appeared in the first volume of the Edinburgh Medical Essays. Monro opposes the commonly-received opinion as to the function of the digastric by the following arguments: That the shortness of the bellies of the digastric does not admit so large a contraction as is often required; —that "the proportional force of the digastric to that of the elevators of the jaw is considerably less than is seen in other parts of the body where antagonist muscles are, which proportional force of these muscles is on some occasions greatly lessened by the angle of insertion of these digastric muscles into the jaw, decreasing as the mouth is opened." He denies the existence of any mechanism akin to a pulley, such as is seen in the larger oblique muscle of the eye. He describes the connection of the digastric with the os hyoides as taking place simply by a firm aponeurosis, which comes off from the round tendon of the muscle, and is in part united to the os hyoides and in part joins the aponeurosis of the opposite side. He denies that there is anything like a sheath in which the middle tendon slides. Lastly, he describes some experiments on the living and dead subject, which he believes disprove the agency, at least, to any great extent, of the anterior or posterior belly of the digastricus in depressing the jaw. He believes the action of the muscle to be principally exercised in deglutition, in which act it pulls the os hyoides upwards, so as to press the root of the tongue against the soft palate. The real depressors of the maxilla he considers to be the sterno-hyoidei and genio-hyoidei, together with the coraco-hyoidei and mylo-hyoidei, which may be looked upon as digastrics whose middle intersection is at the hyoid bone; and also the sterno-thyroidei, thyro-hyoidei, hyo-glossi, and genio-glossi, which, in their united action, are to be considered as two many-bellied muscles acting on the lower jaw. (1)

The opinion which is now generally held, and which is probably correct, may be taken as a mean between the opposite views of Hunter and Monro. Anatomists generally allow that the principal instrument in the depression of the jaw is the digastric; but in order to the production of that effect it is necessary that the os hyoides should be fixed, which is done by the agency of the muscles that pass between that bone and the sternum and scapula, so that the latter are indirectly depressors and Thyroide Cartilage, would probably be depressed, as the bellies of the Sterno-Hyoidei, and of the other lower muscles, are by much the longest; but on the contrary, we find that the Os Hyoides, with the Thyroide Cartilage, is a little raised in the depression of the Jaw, which we may suppose to be done by the anterior belly of the Digastric: (*i*) and secondly, if these Muscles were to act to bring about this motion of the Jaw, these parts would be brought forwards, nearer to the straight line between the Chin and Sternum, which is not the case in this action; whereas we find it to be the case in deglutition, in which these evidently act. By applying our fingers upon the Genio-Hyoideus, and Mylo-Hyoideus, near the Os Hyoides, between the two anterior bellies of the Digastric, (not near the Chin, where the action of these two bellies may occasion a mistake), we find these Muscles quite flaccid; which is not the case in deglutition, nor in speaking, in which they certainly do act; nor do we find the Muscles under the Os Hyoides at all affected, as they are in the motion of the Larynx.

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(1) Medical Essays and Observations by a Society in Edinburgh, vol. i., 1733.

It has been observed, that when we open the mouth, while we keep the Lower-Jaw fixed, the fore-part of the Head or Face is necessarily raised. Authors have been at a good deal of pains to explain this. Some of them considered the Condyles of the Jaw, as the center of motion; but if this were the case, that part of the Head, where it articulates with the Spine, and of consequence the whole body, must be depressed, in proportion as the Upper-Jaw is raised; which is not true in fact. Others have considered the Condyles of the Occiput as the center of motion; and they have conceived the Extensor Muscles of the Head to be the moving powers. The Muscles which move the Head in this case, are pointed out by two circumstances, which attend all muscular motion; in the first place, all actions of our body have Muscles immediately adapted to them; and secondly, when the mind wills any particular action, its power is applied

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of the maxilla. It is also generally admitted that all the other muscles which pass from the os hyoides to the maxilla when the former is fixed, become accessories of the digastric in this act. When, on the contrary, the jaw is fixed, the contraction of the digastric must raise the os hyoides and the parts attached to it. This action of the digastric is called into play in deglutition when, together with the stylo-hyoid, mylo-hyoid, and genio-hyoid, it elevates the hyoid bone, and with it the base of the tongue. In swallowing the mouth is first closed.]

(*i*) [Monro states that the os hyoides moves downwards and forwards when the mouth is opened. In observations on myself and others I have never been able to arrive at the conviction that the hyoid bone and thyroid cartilage are raised when the lower jaw is depressed, as is asserted in the text.]

by instinct to those Muscles only, which are naturally adapted to that motion; and further, the mind being accustomed to see the part move which is naturally the most moveable, attends to its motion in the volition, although it be in that instance fixed, and the other parts of the body move towards it; and although the other parts of the body might be brought towards it by other Muscles, and would be so, if the mind intended that they should come towards it, yet these Muscles are not brought into action. Thus the Flexors of the Arm commonly move the hand to the body; but if the hand be fixed, the body is moved by the same Muscles to the hand. In this case, however, the mind wills the motion of the hand towards the body, and brings the Flexors into action; whereas if it wished to bring the body towards the hand, the Muscles of the fore-part of the body would be put into action, and this would produce the same effect.

To apply this to the Lower-Jaw; when we attempt to open the Mouth, while the Lower-Jaw is immoveable, we fix our attention upon the very same Muscles (whatever they are) which we call into action, when we depress the Lower-Jaw; and we find that we act with the very same Muscles; for our mind attends to the depressing of the Jaw, and not the raising of the face; and under such circumstances the mouth is actually opened. We find then by these means the head is raised; and the idea that we have of this motion, is the same that we have in the common depression of the Jaw; and we should not know, except from circumstances, that the Jaw was not really depressed; and we find at this time too, that the Extensors of the head are not in action. On the contrary, when the Jaw is fixed in the same situation, if we have a mind to raise the head, or Upper-Jaw, which of course must open the mouth, we fix our attention to the Muscles that move the head backwards, without having the idea of opening our mouth; and at this time the Extensors of the head act. This plainly shows, that the same Muscles which depress the Jaw, when moveable, must raise the head, when the Jaw is kept fixed.

This is a proof too, that there are no other Muscles employed in depressing the Lower-Jaw, than what will raise the head under the circumstances mentioned. This will further appear from the structure of the parts; wherein four things are to be considered, viz. the articulation of the Jaw; the articulation of the Head with the Neck; the origin, and the insertion of Digastric Muscle.

Suppose A, the Upper-Jaw, (*j*) to be fixed, and the Lower-

(*j*) [*Vide* Plate 3.]

Jaw B, to be moveable on the Condyle C: if the Digastric contracts, its origin E, and insertion F will approach towards one another; in which case it is evident, that the Lower-Jaw will move downwards and backwards. But if the Lower-Jaw be fixed, as in the case supposed, and the Vertebræ G G G be also fixed, the Condyle will move upwards and forwards upon the eminence in the joint, the fore-part of the head will be pushed upwards and backwards by the Condyle, and the hind-part of the head will be drawn down; so that the whole shall make a kind of circular motion upon the upper Vertebræ; and the Digastric Muscle pulling the hind-part of the head towards the Lower-Jaw, and at the same time pushing up the Condyles against the fore-part of the head, acquires, by this mechanism, a very considerable additional power.

(To be continued.)

ORIGINAL COMMUNICATIONS.

ON THE APPLICATION OF HARDENED INDIA-RUBBER TO THE MANUFACTURE OF ARTIFICIAL TEETH.

A Paper read at the Monthly Meeting, held at the College of Dentists, February 5, 1861.

By Felix Weiss, M. C. D. E.

It can hardly have escaped the observation even of the least observant, that the arts and sciences have of late years made wonderful progress: not only have new substances been discovered and many valuable compounds added to our store of useful materials, but preparations long known and valued have been newly applied to a hundred uses our forefathers never dreamed of. It could hardly be expected that while our Profession numbers several thousands, and among them men of the keenest perceptions, enlightened views, and large general information—it could hardly be expected that our art should remain unaltered or unimproved. As each new substance was discovered, its application to Dentistry was considered—in some instances positively applied, in others merely suggested. Thus, we have ten or a dozen materials which have severally been proposed as applicable to the manufacture of artificial teeth: of these, gutta-percha, aluminium, hardened india-rubber, and collodion are the latest novelties.

Now, while we should at all times exercise the strictest circumspection in advocating the general adoption of any new material, while nothing should induce us to recommend that of which we have not a personal experience, yet, on the other hand, it must be allowed that these suggestions merit more than a passing thought, and it is our bounden duty, if we value our position or the comfort of our patients, to test their importance, and privately convince ourselves either of their value or uselessness. I am sorry to remark that many members of the Profession evince too great an eagerness for novelty, precipitately recommending that of which they can have but a very slight knowledge, and, desiring to possess something not yet possessed by their Professional brethren, rush into error they afterwards have cause to lament; but by far the majority err in opposing that which is new, and it is not until an invention has become nearly general they give it the smallest attention. Consider for one moment how injurious such a course would be if applied to every improvement: we should go plodding on the beaten track, neither desiring nor encouraging invention or discovery, while it should never be forgotten that every invention—every real improvement—not only raises us in the scale of intellectual beings, but contributes largely to the comforts of our social position, as well as to the stability of our national prosperity.

I greatly desire that these introductory remarks should carry with them more than their usual weight, as they preface a subject never before publicly discussed, or, indeed, written upon connectedly. Hardened india-rubber, or Vulcanite, as it is generally called, although now so extensively used, has not yet formed the subject of either paper or treatise, and I shall have to beg your indulgence for much that may appear crude and scarcely yet practically understood; but I must observe, in commencing, that I am greatly indebted to many members of our Profession for the kind assistance they have given me, and the many valuable hints they have furnished. I would also desire to express how greatly I am indebted to the various Dental Depôts: and, indeed, it is manifest that those days have passed away when the fostering of an exclusive spirit meets with the slightest recognition; on all sides the honourable portion of the Profession appear to be actuated but by one desire—the elevation and enlightenment of all its members.

The history of the application of hardened india-rubber to Dental purposes may be dismissed in a few words. In the year 1843, a patent was granted to Mr Thomas Hancock for the preparation of hard vulcanite; but he does not in any way specify the uses to which it might be applied. In the year 1851, Mr Newton, an agent for Mr Goodyear, was granted a patent for the application of vulcanite to various purposes; but among these no mention is made of it as a base for artificial teeth. In the year 1855, we find Mr Goodyear patenting the application of vulcanite as plates for artificial teeth, and a description is given of the method of carrying out this application: the patent was, however, allowed to lapse through the non-payment of the Government fees. At length Mr C. S. Putnam came over to this country, and obtained letters patent for an apparatus for hardening India-rubber,

&c., by steam. This was in July 1858; and in less than three months Vulcanite was received by the leading Members of the Profession as a valuable addition to our list of materials.

The beginning of 1859 introduced two more patents—one by Mr James Childs, for what was termed a Super-heated Steam Vulcaniser, and another for an apparatus for hardening rubber by dry heat. Having glanced at the principal patents taken out to facilitate the working of this process, let us now inquire "What is Vulcanite?"

Years ago, it was discovered that, by the addition of sulphur to india-rubber, an extraordinary amount of elasticity was given to it, without in the smallest degree counteracting its other qualities, and, when so prepared, was termed Vulcanised India-rubber. Soon afterwards, it was found that if a larger proportion of sulphur be employed, the material lost to a certain extent its elasticity, became rotten and softened at a temperature below that of boiling water; but its more remarkable quality was, that upon being subjected to a heat varying from 280° to 315°, and kept at that temperature for some time, it hardened, and, when cooled, presented a close, firm texture, was possessed of great toughness, resisting the action of both acids and alkalies, and capable of bearing a high polish. It was formed into a variety of articles, and, lastly, was suggested as a base for artificial teeth. To harden this rubber became the great subject of discussion among Dentists, some advocating the application of steam heat, and others contending that dry heat was just as efficacious.

We shall commence by detailing experiments made with the dry process; but, before doing so, it is necessary to give some description of the manner in which the teeth are mounted in both processes, and I shall endeavour to do so as briefly as possible, the subject being now so generally understood. An impression of the mouth is first taken with the greatest accuracy: for taking impressions some Practitioners advocate the use of composition, others gutta-percha, or even plaster, but the majority find good wax quite sufficient. From this impression a model is cast in plaster of Paris, and upon this model the piece or set is mounted in wax, the mineral teeth all standing in their true positions, the work being finished off as accurately as if it were the piece to be placed in the mouth: and I may here remark, in passing, that too much attention cannot be paid to the finish of the piece of which the vulcanite is to be a duplicate, as much time will be saved by doing so. The teeth being correctly mounted, the model is set in the lower half of what is called the flask, the upper half put on and filled with plaster, care having been taken to paint over all the surfaces, and also the wax, but not the teeth, with some non-adhesive compound, such as oil, soap, or the material prepared by Messrs Ash for the purpose, to prevent the parts from sticking together. When the plaster is set, the two portions of the flask are to be separated : if teeth should be standing on the model, the flask had better be warmed in hot water first; but should the case be a plain upper or lower, they will separate easily without. The wax being picked out, a stream of boiling water should be poured over the inside of the teeth, to remove any trace of wax which might be adhering. If it is to be vulcanised by steam, the case is now ready for packing. In doing this, I cannot say that I admire the usual vulcanite warmer : I greatly prefer a plate, supported on a vessel of water, which is kept boiling by a jet of gas. If this plate fits pretty accurately, the vulcanite can be heated to about 212°, at which temperature it is so thoroughly softened that much less difficulty will be experienced in the packing, particularly inside the teeth. It is also well to cover the plate with a piece of linen, to prevent the vulcanite from sticking; and, when sufficiently packed, a piece of tissue-paper should be placed on the model, or the plaster rubbed with powdered French chalk, and the two halves of the flask brought together in a press, or, what is not so good, although generally employed, a large vice. The use of the tissue-paper or chalk is to prevent the vulcanite from sticking to the model, and to enable the flask to be opened if required, to see that a sufficient quantity has been packed in.

I shall presently have to refer to many different modes of manipulating, and shall describe the merits of a variety of flasks, but I must first enter into some explanation of the two systems of vulcanising. Where it is intended to employ dry heat, it is necessary thoroughly to dry the models before packing in the rubber. Any description of iron vessel will answer as a vulcaniser, so that it has a hole in the lid to introduce a thermometer; and the thermometer must be so placed that it can be lowered to the bottom of the chamber, the floor of which should be covered to about an inch in thickness with sand.

Now, the whole secret of success in the dry process depends upon the regulation of the heat, which should be allowed to mount slowly and steadily to 310°, but on no account should exceed that temperature. It must not take less than three-quarters of an hour to arrive at 310°, but it is from 212° to 310° the greatest danger lies. If the heat proceeds more rapidly, you may consider the piece as lost; and if, after it has slowly mounted to 310°, it by accident runs up higher, the chances are as ten to one that the piece has blow-holes in it. The flask should on no account touch either the metal bottom or the sides of the chamber, as the flask so touching may be at a much higher temperature than that registered by the thermometer, owing to the conduction of heat by the metal.

However carefully the process may have been carried on, should the heat for a moment mount to 400°, the rubber will have circular blows in it; it will not be spongy, as we observe, when it is heated suddenly, but it will appear as though the rubber had became partially hardened, gas being formed, which, owing to the denseness of the material, could not pass out. This will be better understood when we come to speak of the changes which the vulcanite undergoes in hardening.

If, however, the heat is allowed to rise slowly, and does not exceed 310°, and the vulcanite is baked the required time, it will be perfectly solid.

Owing to the length of time required to dry the models, and, if hurried, the injury that was done to the plaster, I commenced about eighteen months ago some experiments upon vulcanising in metal. I found that by this method the vulcanite hardened in a much shorter time, and appeared to be of a better colour. The manner in which I proceeded is detailed in the DENTAL REVIEW for November 1859. I shall, therefore, merely give a cursory description of the process here.

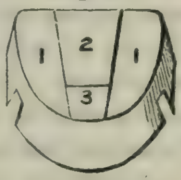
The model was cast in metal, and the teeth mounted in the usual manner, but with pipeclay instead of wax: this was easily done, and a highly-finished piece produced.

The metal model was then placed in the lower half of the flask, metal run round it, and then the upper half added; walls of pipeclay being built across the flask, and so arranged that the upper half or counter model was made in three or four pieces; all the metal surfaces were washed over with chalk and size to prevent them from uniting, and care was taken that the pipeclay was dry.

The manner in which the counter-model was made will be better understood by referring to the illustration (fig. 1).

The divisions 1, 1, were first cast, the pipeclay barrier then removed, the metal surface washed with size and chalk, and 2 was cast; the pipeclay, 3, was then picked out, and metal substituted.

Fig. 1.



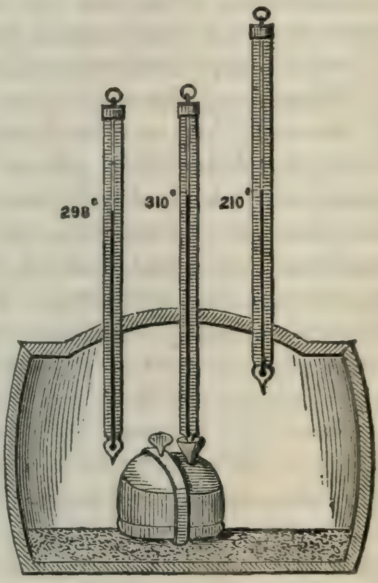
When cool, the whole was taken to pieces; and if the teeth had any tendency to move about, they were fixed in their places with a little white spirit varnish, and wherever the metal was likely to come in contact with the vulcanite it was painted over with chalk and size, and, indeed, where it could be easily done, tissue-paper was laid between. The counter-model being warmed, the rubber was packed in very rapidly, and the flask closed. As any reasonable amount of pressure could be exerted, the piece became a perfect fac-simile of the pipeclay model.

Now, this process had some advantages over that with dry plaster. The teeth took a very short time to mount; the metals were run rapidly, the pieces were packed easily, and it required only half the time in vulcanising; but it had its disadvantages: unless the paper and chalk covered all the parts, they were liable to stick together, although hot water would sometimes readily separate them, and where many teeth were standing it was difficult to remove the piece from the model; but by far the greatest annoyance was that only a few rubbers would stand the heat. I made all my earlier experiments with Child's G rubber, and in no instance do I remember to have had a failure. I constructed a variety of pieces in that material without disappointment; but, strange as it may appear, when I came to employ other rubbers, I found them most uncertain: but to this point I shall return when I come to speak of the vulcanites in general use.

As I shall not again have to refer to the dry method, I cannot conclude without calling attention to some of the inconveniences connected with this process. Where a number of pieces have to be vulcanised at the same time, it will be found that some are done before others, especially those in the lower part of the chamber if the heat is communicated from below, and in every instance the pieces that are placed nearest the flame or fire. Again, it will be found that the thermometer registers a different degree in different parts of the vessel; so that while some may not be receiving sufficient heat, others are being overdone. To correct this difficulty, an outer chamber may be made and filled with oil: but this is not sufficient, and a truer method of arriving correctly at the positive heat of the flask is by having a metal cup fixed to it, and filled with oil, which the thermometer is made to dip into, having passed through the lid of the digester. Where more than one flask is used, they must be bound together with wire; and as the metal surfaces come in contact, the temperature of one will be within a degree that of all. This is, without doubt, the most certain method of practice, and the one attended with the least risk.

The accompanying illustration (fig. 2) represents a chamber, the floor being covered with a layer of sand, upon which rests a flask, into the lid of which a small metal cup is screwed: this is filled with oil, and it will be found that, while the thermometer registers 310°, a similar thermometer placed at the side, and not in contact with the metal, stands at 298°, while the upper part of the chamber is only at a temperature of 210°. Thus, it will be seen that one of the great causes of failure in the dry process has been the want of a correct register of the heat; for while the thermometer stood merely at the side of the flask, and pointed to 310°, the flask itself, most likely, was up to 322°, and the piece or pieces full of bubbles, which could not be accounted for.

Fig. 2.



When a piece has been successfully vulcanised, I cannot discover that it differs much, either in colour or in hardness, whether done by this process or by steam. I certainly have found some pieces exceedingly brittle, but in every instance they have either been overdone or baked too quickly. Where time is no object, there can be little doubt the dry process may be made as successful as the steam; for pieces vulcanised in eight or ten hours, the temperature never having exceeded 300°, and standing, for the most part, at 290°, are perfectly elastic, good in colour, and seldom, if ever, have bubbles. When the heat mounts to 320°, more danger exists; and although fifty pieces may be made, one after the other, successfully, the fifty-first may prove a failure.

A more perfect medium for vulcanising in is oil. I do not mean simply to surround the chamber, but to immerse the piece in altogether. Here, however, the great drawback is, that vulcanite is found to be soluble in that fluid, and although the piece may be hardened, its external surface is soft and greasy. I cannot help thinking that mercury might be used for the same purpose. I have not yet tried it, and therefore simply throw it out as a hint. Regarding the time required to vulcanise by the dry process, everything will depend upon the size of the piece and the material it is hardened in, and also upon the quality of the rubber which has been employed. If metal is used, one hour at 310° is sufficient for pieces not exceeding one-eighth of an inch in thickness; and in no instance should a piece remain longer than two hours. If in plaster perfectly dry, two hours for small pieces and four for large will be sufficient. When attempts are made to vulcanise at a lower temperature, a longer time will undoubtedly be required.

Before concluding this part of my subject, I must apologise for much that may appear tedious and possessed of but little practical value, the process of vulcanising by steam being now so general and so much simpler; but while treating upon the hardening of india-rubber, I was compelled to admit that the dry process might be employed successfully, that no failure ever did occur that had not its cause, and that cause might be discovered and corrected. I have been compelled, unfortunately, to labour unassisted in this process, it having been but little practised, and, I think, less understood. The great cause of failure appears to me to have been the difficulty in assessing the temperature of the flasks; but by the simple cup contrivance I have adopted, that part of the process has been much simplified, and by attending to the directions I have laid down success may generally be insured.

(To be continued.)

ON THE SCOPE, TENDENCY, AND EDUCATIONAL VALUE OF THE NATURAL HISTORY SCIENCES.

By T. Spencer Cobbold, M.D., F.L.S.,

Lecturer on Comparative Anatomy, Metropolitan School of Dental Science.

(Delivered at the Royal Institution of Great Britain, on Friday Evening, April 20th, 1860. Sir Henry Holland, Bart., M.D., LL.D., D.C.L., F.R.S., &c., Physician to the Queen, in the Chair.)

Sir,—I purposely design that the subject proposed for this evening's discourse should be presented to you in the form of an appeal advocating and demonstrating the necessity for a wider diffusion of the Natural History Sciences.

In the earlier days of scientific pursuit, the cultivators of Natural History confined themselves, for the most part, to the mere collection of cabinet curiosities, whose individual worth was estimated by comparative rarity or singularity of form, whilst the more important facts in regard to the relation of animal, vegetable, and mineral bodies, the one to the other, were entirely overlooked. In recent times, however, the votaries of science, by tracing out the intermutual relations and the reciprocal influences which these bodies directly and indirectly exert upon one another, have fairly realised the existence of a fundamental unity of plan pervading all created nature throughout *time* and *space.* I believe, indeed, with respect to this planet, that it is not too much to affirm, that in all epochs of the earth's history—in whatever phase its cosmical elements have appeared—the laws prevailing hitherto are the same as those in operation at the present day; whilst the singularly varied results which we now witness are regulated by the *degree, direction,* and *conditional circumstances* under which those laws are permitted to exercise their sway. To demonstrate the truth of this persuasion in its entirety is not my present concern; yet, I have not hazarded this generalization without careful, prolonged, and independent reflection.

Were it now my intention to develop the legitimacy of this hypothesis, it would be necessary—in order to give full effect to its claims—to furnish illustrations too numerous and varied for a single discourse. I will endeavour, nevertheless, to throw a ray of light on the matter.

As far as the mere toil of observation goes, whether natural or artificial, the Naturalist may be compared to an Astronomer, whose investigations embrace so vast a region, that in proportion as his examinations become minute, so do the limits of his study recede, appearing more and more distant and immeasurable.

Whatever section, or segment of the circle of the known, engages his immediate attention—and the same thing holds good if we suppose him to be acquainted with all the results which the combined experience of his fellow-workers has produced—whatever department of the known, I repeat, is occupied, the regions unexplored must necessarily enclose oceans of truth for ever hidden from his gaze.

Reflecting on such a consideration as this, I can readily imagine that some such a question as the following may occur to you, and I shall suppose that you put it to me thus: "If, as you aver, the known bears so insignificant a proportion to the unknown, might not a more extended acquaintance with those unexplored regions—assuming it possible to acquire this knowledge—produce facts or phenomena the study of which, if submitted to the ordinary inductive tests, would be sufficient to weaken or altogether overthrow your generalization?"

To this I confidently answer,—Certainly not!

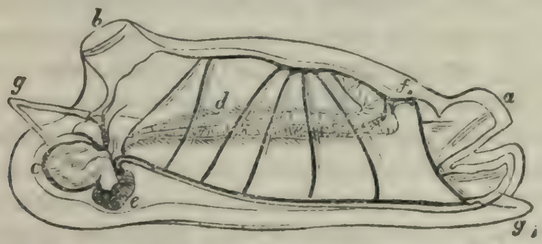
Let us, if you please, look more closely to the position of the Naturalist—or say, rather, the Biologist.

For the sake of illustration, we assume that a particular Fauna or Flora, or a particular group of individualities, or, in the case of the Comparative Anatomist, a particular system of structures (such as the organs of circulation) engages for a time his exclusive attention.

In any of these attitudes the Biologist is precisely in the position of a traveller mapping out the features of an unknown continent. By careful observation, powerfully developed by artificial methods of survey, he makes himself acquainted with all the phenomena presented within the limited area of his wanderings, and, by a comparison based chiefly on analogy, deduces a series of *general propositions* or conclusions in regard to that which lies beyond his reach. Experience has shown that in this way a correct and comprehensive generalization may be established respecting the actual condition of the continent in its entirety, although, of course, the traveller's conceptions of the minor features presented by unexplored districts must necessarily remain imperfect, or altogether fallacious. How is this? Simply, I argue, because, although the laws regulating the phenomena of nature over all parts of the continent are constant and invariable, the *degree*, *direction*, and *conditional circumstances* under which they operate may, and often do, produce such strangely-modified results, that when we descend to particulars we are sure to meet with the most irregular, varied, and unlooked-for phenomena.

Let us now apply this train of reasoning in the case of the Comparative Anatomist, selecting for special illustration Dr J. C. Van Hasselt's discovery of the peculiar mode of blood-circulation which obtains in Salpa (fig. 1)—a genus of tunicated mollusks.

Fig. 1.



The form of *Salpa* known as *S. maxima*, as represented by Milne-Edwards. According to the philosophical explanations of Prof. Huxley, this outline should be reversed, in which case the parts are as follows:—*a*, inferior lip of the anterior respiratory aperture; *b*, posterior breathing orifice; *c*, abdomen containing the visceral nucleus; *d*, branchial lamina or gill; *e*, heart and dorsal vessel; *f*, nerve-ganglion, or so-called oculiform point; *g*, *g*, appendages of the test.

The direction of the circulating current alternates, the flux and reflux occurring at regular intervals.

The student of the circulation, who during years of investigation found this life-stream flowing through the ordinary channels in one invariable direction, has suddenly become acquainted with an animal in which the direction of the life-stream is periodically reversed; and, to continue our *simile*, this new experience is comparable to that of the traveller who has accidentally stumbled upon an unexplored district presenting unique geographical features. Here, then, you perceive, is a natural phenomenon utterly at variance with the investigator's former experience; and this fact, whilst it cogently illustrates, on the one hand, the danger of drawing general conclusions from the study of isolated genera or data furnished within a very limited area, does not, on the other hand, destroy the value of a wider generalisation. The physico-vital laws regulating the flow of blood in *Salpa* are the same as those operating throughout the entire animal series; but the *degree*, *direction*, and *conditional circumstances* under which they act have given rise to phenomena not only unusual, but without parallel in the domain of the Physiologist's experience; and I have thus shown that in one department of Biology, at least, the Naturalist epitomises the practical knowledge of the traveller.

Again, I would ask you to bear in mind that the traveller or geographical geologist deals with phenomena as they occur in *space*. An evening's discourse would fail me to show you by illustration that phenomena in space have their dissimilar counterparts in *time*.

This idea, indeed, has been in some measure substantiated by the late Professor Edward Forbes, in his discourse 'On the Manifestation of Polarity in the Distribution of Organised Beings in Time,' delivered in the theatre of this Institution on the evening of Friday, 28th April, 1854. Nevertheless, calling to our aid the inductions of the Paleontologist, the experimental demonstrations of the Physicist, and the sublimer researches of the Astronomer, we are led to assume, by a species of analogy perfectly legitimate, that the laws operating throughout *space* are the same as those in *time*; and therefore I have submitted to your judgment a broad hypothesis, which, whether roughly or gently handled, is valuable only in so far as it reflects the harmonious outlines of inestimable truth.

Were it desirable, by a further reference to existing facts, to increase the force of our hypothesis, for this purpose *any* of the more remarkable chemico-physico-vital phenomena which ordinarily present themselves to the mind of the Biologist might with almost equal advantage be adduced, and the truth thereby be rendered more conspicuous. Quitting, however, this special application of the subject, I have further to observe, that throughout the entire range of organised existences—whether animal or vegetable—there may be traced a community of plan both in structure and development; and it is whilst engaged in the study of any department of Natural History knowledge, that we are sure to recognise its influence in the aspect of an all-pervading law. In every natural group of individualities, or of separate organs—such as those of special sense, for example,—the working of this law is more or less conspicuous; and it is the recognition of its existence despite the modifying power of interfering circumstances, which, to my mind, at least, imparts a perfect charm to study of the sub-sciences of Physiological Botany and Comparative Anatomy, enabling us to interpret accurately the signification of every structural and morphological peculiarity, whether it occur in the human economy, or in the framework of any plant or animal.

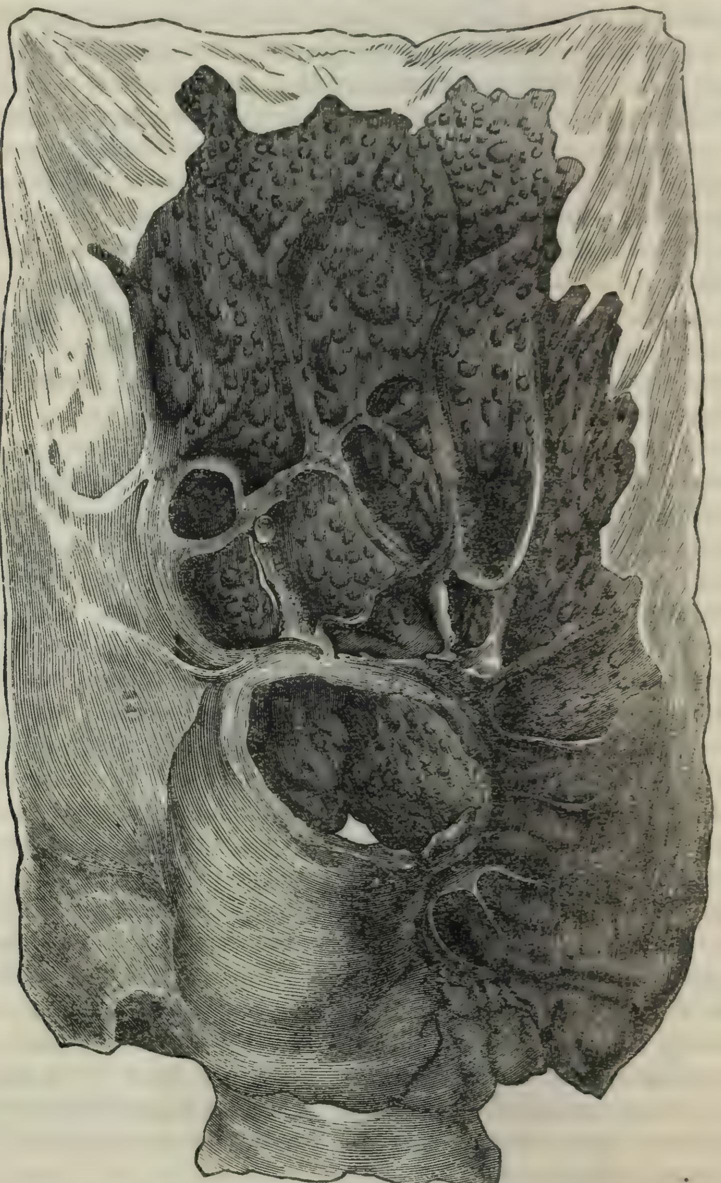
For the partial recognition of the bearings of this law—which Von Baer has defined as the "law of developement from the general to the special"—as well as for the full understanding of its character, it is fortunately not necessary that our studies should embrace the whole range of Botanical or Zoological Science,—although, of course, our conceptions of its power and universality are enlarged to a degree precisely corresponding with the range and direction of our pursuits; and as this community of plan, associated with variety of purpose, is not confined to any particular series of organs or organisms, it consequently follows, that (in order to meet the varied requirments of the several creatures in which special developments occur) we find the same series of homologous structures strangely modified in form and function to suit the foreknown exigencies of every species.

From the tenor of this last observation, it might seem very natural that I should revert to the seemingly opposed theories of Cuvier and Geoffroy St Hilaire; but the points in their dispute have been so frequently commented on by abler speakers, that I shall only offer a passing remark:—I think we may fall in with the spirit of the Cuvierian hypothesis, and say thus much, at least, viz., that the totality of the phenomena presented by any individual, species, genus, or natural group of beings, indicates a distinct provision for the preservation and perpetuation of the individual, species, &c.; this provision being limited by the operation of antagonistic forces from within and without, necessary to the welfare of other co-existing species, &c.; and that the balance of these mutually-opposing influences is in the main progressive, conservative, and perfective. I have no wish now, however, to pursue this question further, otherwise I should be led to take into consideration Mr Darwin's theory in relation to the origin and succession of species. In regard to the hypothesis of Geoffroy St Hilaire, in so far at least as it applies to the development of particular organs, it is clearly manifest that many structures exist without the slightest utilitarian purpose being subserved by their presence; these are mere type-manifestations or morphological indications of some organ whose assumed completeness may, or may not, be present in some other living or pre-existing allied species.

As an illustration of this, allow me to direct your attention to the occurrence of a singular pouched structure which I have discovered in connection with the ileo-colic valve of the alimentary canal of the Giraffe :

The intestinal glands in ruminants generally (as stated in my article *Ruminantia,* in the Supplement to Dr Todd's Cyclop. of Anat. and Phys.) do not offer any deviation worthy of notice; but here we have a curious exception to the rule affecting the last Peyerian patch which extends considerably beyond the ileo-colic opening. This organ is both striking and complicated, as seen in the accompanying woodcut (fig. 2). It will be observed that there are from fifteen

Fig. 2.



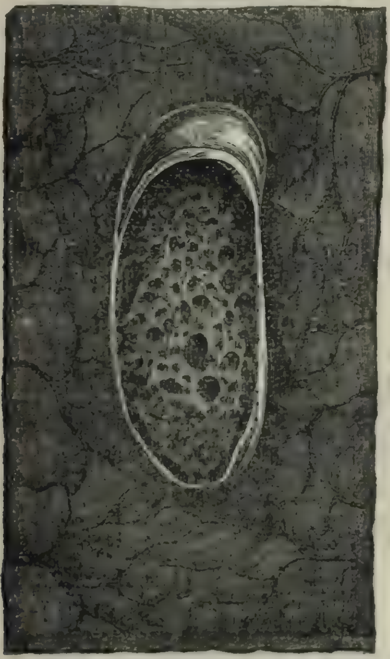
Sacculated Peyerian Gland adjoining the ileo-colic valve. From a Giraffe about two years old. Natural size. (Original.)

to twenty sacculi, so combined as to form a network of cells, seven of them resembling in some degree the water-reservoirs of the *reticulum*, and having a depth varying from three to four lines: the remainder are more or less incomplete, whilst those farthest from the ileo-colic valve are mere depressions, the walls of separation being scarcely elevated from the surface. With the exception of two small fossæ seen to left of the orifice, and three larger below towards the cæcal extremity of the gut, the entire mucous membrane, both within and without the pouches, is beset with follicles having precisely the same character as those of the last Peyerian patch within the small intestine. Some few of the sacculi are subdivided by secondary lamellæ; but, generally speaking, these are not very prominent. The larger folds are extremely thin-walled, transparent, and extensile, so that the amount of secreting tissue becomes much greater than is at first sight apparent; in one example, to the left of the figure, the orifice of the sacculus is much contracted, while the cavity, on the other hand, is particularly capacious. Altogether, without taking into consideration the laminæ, the follicular structure covers a space equal to about two square inches.

In a young Giraffe more recently dissected, I found this curious development still more complicated. In this case there were at least twenty circumscribed fossæ. Ten exhibited very small outlets, and two or three of the larger and more patent pouches displayed secondary sacs in their interior.*

A few of the Peyerian glands occupying the small intestine also display a tendency to this folding, and afford a consequent increase of the secreting element. This was especially marked in the younger Giraffe just alluded to; but in the other animal the folds were also present, consisting of semilunar valve-like productions, forming a kind of hood overlapping the duodenal end of each patch. This is well shown in fig. 3, where the concavity of the hood is seen to be capable of admitting the tip of the little finger.

Fig. 3.



One of the ordinary compound or Peyerian Glands of the Giraffe, showing a valvular hood-like fold at the duodenal end. Natural size. (Original.)

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* See 'Proceedings of Zoological Society' for February 1860, where full references are given to other original Memoirs in connection with this subject.

From these demonstrations, you will perceive that the Peyerian agminated follicles may be legitimately associated with the highly-developed compound lobulated glands, such as the sublinguals, the parotids, and the tonsils; and the latter, again, may be regarded as morphologically analogous, and also serially homologous with the liver and pancreas. The remarkably capacious outlet of the tonsil in the Giraffe renders this mere comparison still more instructive and significant.

There is yet another aspect in which the structure I have just described may be advantageously considered—a view which I have recently urged in the Anatomical Memoir communicated to the Zoological Society. I allude to it as an illustration of the value of anatomical research in relation to the determination of zoological affinity. The Giraffe is an animal admittedly aberrant and osculant, partaking of characters more or less common to the cervine, antilopine, and cameline ruminants; yet, here we have (in addition to the peculiar horns and partially distinctive cranial, lingual, and external modifications suited to the animal's mode of existence) an entirely unique development connected with the digestive system. When, therefore, it is considered that this marked peculiarity is not known to be shared by the allied families above referred to, and that the complexity of the organ has arrived at a point far beyond the ordinary development of Peyer's glands, I think it but fair that Zoologists should welcome the discovery of a structure which, whilst it lends aid to their definitions, justifies the recognition of the Giraffe as the type of a separate family. This argument loses none of its force from the circumstance that this separation has been advocated on other grounds, such as arise out of the presence of pseudo-keratophorous epiphyses associated with other superficial characters.

In the tracing out of such relations consists the charm of Zoological pursuit, and this is a tendency common to all Natural History Sciences. On independent persuasion, therefore, I respectfully argue that no viscus or system of tissues should be excluded from the characters employed in the determination of zoological affinity—certainly not, at least, when any marked deviation from a classic, ordinal, or generic type is sufficient to impart distinctive cogency to the balance of hypothetical analysis. The comparative perfection of our knowledge of the proper definitive allocation and relative position of organised beings—whether arranged in groups, species, or individualities—doubtless depends on the accuracy and grasp which an extended experience is calculated to supply; but I also submit (and herein, you perceive, lies an argument for the wider diffusion of the Natural History Sciences) that no structural phenomena, great or small, external or internal, scarce or invariable, can be too unimportant to be carelessly eschewed.

With restricted views and artificial classifications, therefore, the Biologist can have no sympathy. The Natural History Sciences must not be allowed each to resemble an eviscerated carcass, but their proportions should be shaped, and their constituent parts welded together, by data culled from every phase of Biological inquiry. Sometimes the principle of classification may legitimately embrace the consideration of purely chemico-vital manifestations; and in the case of Zoology, we have seen that it may prominently involve a recognition of deep-seated anatomical appearances.

Before leaving this part of our subject, I may observe that the principle of classification is intimately associated with the study of Morphology; but at this stage of the discourse I can do no more than refer to one particular generalisation, which has also an important bearing on the hypothesis first submitted to your notice. It is this, viz., that "the variation of all animal and vegetable forms is subject to a law of geometrical proportion." We cannot now follow up this inquiry; yet I venture to think that, in addition to the curious results obtained by Mr Hay in reference to the application of mathematical principles to the æsthetics of the human figure, and likewise to those obtained by Professors Mosely, M'Cosh, and others, in respect of the forms of shells and plants—in addition, I repeat, to these (associated with other like generalisations, such as the "law of spiral development" and the "law of numerical proportion"), I think it can be shown that similar geometrical laws are applicable to the harmonies noticeable in Zoological affinity, and, possibly also, to the distribution of species. Be that as it may, all nature is but a cycle of harmonies, wheel within wheel; but the relation of the enclosed spheres is so complicated, that to fathom the resources of any group of them requires a combination of powers beyond the reach of any single individual.

(To be continued.)

THE DENTAL REVIEW.

LONDON, MARCH, 1861.

The question has been brought up over and over again, how far Professional men are to be allowed to make known their qualifications and attainments, real or assumed. In Medical practice, while there is no law, corporate or other, to prevent any man from advertising himself on every bill-post from the Land's End to the Hebrides, the effect of public opinion is sufficient to keep the practice of advertising in decent check, and to confine the advertising crew to a few who, having thus abandoned their virtue, are content to leave it abandoned, and to live apart from the rest of their brethren, gratifying a grasping selfishness at the sacrifice of all that honour and good fellowship can confer.

In our Profession there is something of the same feeling, but with differences which make a specialty of the facts. In the Medical Profession, no man who had placarded the streets with boards carried by the shoulders of a miserable half-tramp, half-costermonger, could by any possibility or pretence hold up his head again, much less take part in the labours of a deliberative assembly. In the Medical Profession, no man who pretended to have a secret remedy could expect recognition: such an one would shut off the expectation from his own imagination. In a word, while in Medicine the qualified man may quack to his heart's content, and retain his qualification as perfect as ever, he cannot proclaim his quackdom for an hour without losing caste for his life.

On our side, we have permitted the walking placard, and have buried it in oblivion. We have even permitted offences against the moral law far more heinous than advertising, and have buried these too in oblivion. We have instituted high tribunals of virtue, and our tribunals have given way to the gentle pressure imposed on them. We have passed stringent laws—both our Professional representative assemblies have passed laws severe to the last degree—against advertisers and scamps of every sort and name. Poor assemblies! All flesh is grass! That assembly which boasts most of its virgin purity is not the most exempt from contamination; but we will join with the assemblies, and forget the past, except when they either of them mouth virtue into licentiousness: then we will pronounce against either, without respect of persons, or of ceremonies, or of pretensions.

Dealing with the general question, we may divide Dentists, real or assumed, into three great classes:—Dentists of the highest class, who have large practices and good scientific standing: the Presidents respectively of the College of Dentists and of the Odontological Society are fair representatives of these—both men of good repute, both above the committal of any act or thought that is not of the most honourable and generous kind. From these there are a large body of middle-class Dentists—some of whom, working for an independent position, are not for a time above giving assistance to those more advanced than themselves.

It has answered the purposes of political intrigue and pretence to call these gentlemen by hard epithets: for our parts, we recognise them as the very heart and soul of the Profession. On them all the after history of Dentistry in its scientific and social progress turns; and whilst it delights us to see that there is a basis of a Profession in them, it delights us not less to observe yearly—nay, monthly—that these, the most important after all of the Dental body, the substance of the Dental body, are working steadily, honestly, truthfully, towards the more perfect discharge of the duties to which they are called.

There is a third and last set of men calling themselves Dentists, to which we can only turn with pain and shame. We mean the advertising quacks with whom our Profession abounds. Stop these by law we cannot: they flourish on law. The most noted instance perhaps of all advertising shams is, indeed, at this time going on under the shadow of a Dental Certificate which boasts its legality. Stop them by moral coercion; can we do this? We can. If the College of Dentists and Odontological Society, having the right object in view, would declare by the voice of the Dental Profession pure and simple, that no man who causes his Profession to be a lie can be recognised by his Profession as anything more or less than he deserves; if these two bodies doing this could make their acts publicly known, the force of the warning, bearing with it no penal nonsense, would do more in one day to place the Dental Practitioner in his true position than any cry about the specific qualifications which fifty Legislatures in their collective wisdom might devise.

The truth is, that the quack exists and reigns by the disastrous divisions in our camp: he once flourished on our apathy and did well; now surviving on our quarrels, he does better, for we put into his hands the power to qualify himself for his detestable occupation and soul-selling greed.

THE question of electing a Dentist to the Royal South Hants Infirmary is for a time put aside by a resolution of the Governors, postponing the election for a period of six months. It is now ruled that the Candidate shall hold a Dental Certificate from some legally-constituted body. This resolution materially modifies the position of the whole subject, and opens another inquiry, viz., What is a legally-constituted body? We confess the answer to this question is most difficult to solve. At the same time, we recognise even in the concession, though it may after all mean nothing more than evasion, a tendency to defer to the liberal and sound opinions of the Local and Medical Press.

SELECTED ARTICLES.

DENTITION AND ITS DERANGEMENTS.

A Course of Lectures delivered at the New York Medical College and Charity Hospital (Session 1860-61).

By A. Jacobi, M.D., Prof. of Infantile Pathology and Therapeutics.

(From the 'American Medical Times.')

Lecture I.

To a truly scientific physician, nothing is more evident than that the physiology and pathology of the human organism have not been sufficiently elucidated. The medical sciences are by no means completely developed; they never will be, for they combine a knowledge of all the varied and intimate physiological functions and obscure pathological changes of the physical and mental organs of the human frame; they never can be, for their basis, the human organism, will and must undergo changes and further development. Those powerful minds who have done most, and are still in our times working most successfully, for the advancement of medical knowledge, have been and are still the first to admit the truth of this proposition, and are the first also to acknowledge that more remains to be done than has been done hitherto. Fortunately, however, there are a large number of subjects so well known and so clearly understood, that even in this ever-changing science we are enabled to point out the way to further investigations, to arrange in mathematical order our conclusions, and win thereby for medical science not only a place amongst the so-called exact sciences, but the acknowledgment of educated men, that it is the noblest and most comprehensive amongst them.

Having the honour, as I believe, of being the first in this country to teach infantile pathology as a distinct and fully independent branch of medical education, I did not deem it proper to begin with a subject liable to be misunderstood, mistaken, or misconstrued. A subject of this description I have therefore determined, in this preliminary course, to consider at length—viz., the Physiology and Pathology of Dentition—a subject which is but imperfectly understood. But there should be nothing mysterious about it; the process of the early formation and the final development of teeth is well understood, and on this safe basis we are able to rest our conclusions relating to pathology and therapeutics. So little, however, can we rely on the correct interpretation of facts by observers, that even here we shall have to contend with prejudice and ignorance.

You know that among the public at large, even among the educated part of the community, teething is regarded as one of the two scapegoats of all the diseases of infantile age. Teething and worms are among mothers acknowledged as the universal and all-powerful sources of disease. Whenever an innocent ascaris or a puny oxyuris is observed in the fæces of a child, worms are, for years to come, considered as the undoubted cause of any disease that may occur. Teething, a normal, physiological development, taking place at an age which for many reasons is subject to a large number of diseases, has a strong hold on the imagination of frightened maternal minds. The first dentition generally occupies the first two years of early infantile life; a period in which the child is peculiarly liable to diseases both numerous and frequently of a dangerous character. As the protrusion of a tooth (and in the average a tooth will cut every month) is a remarkable phenomenon, and is something new and visible to the eyes of even the most short-sighted, it is believed to be the cause of every unfavourable occurrence in early life. A mother will bring to you her child, thin, emaciated, and anæmic, with sunken eyes and the wrinkled physiognomy of old age, and tell you that she is well aware the poor thing is suffering from teething, and that therefore nothing can be done to alleviate its sufferings. She will never be convinced that her child is dying from her own neglect; but she has allowed a slight catarrh of the intestines, perhaps, to degenerate into incurable ulceration of their follicles. Thus you will learn that ignorance and prejudice will attribute all, or nearly all, the diseases of the infantile age to a normal process. To the same cause are attributed inflammations of all the external and internal organs, the brain and its membranes, air-passages and lungs, mouth, throat, stomach, and intestinal canal; as also cough, vomiting, diarrhœa and dysentery, derangements of the secretion and emission of urine, chronic eruptions of the skin, convulsions and paralysis, exudations of serum, and extravasations of blood, in any of the numerous organs of the infantile body. Teething is thus considered the efficient cause of most of the terrible diseases which prove fatal to thousands of the rising generation. I can assure you that the readiness to attribute all the diseases of infantile life to teething has destroyed more human beings than many of the wars described in history. For though parents are so much impressed with the belief of the dangers of teething, still they never think of attempting to save the lives of their children by counteracting the supposed life-endangering power of a normal process.

The common supposition that teething is a predisposing cause of disease, nay, even a disease in itself, prevails over all civilised and half-civilised countries. What is now, however, the belief of the public, has been the conviction of the medical world through centuries, almost down to the present time. General experience shows that the persuasion of the scientific world, after having been given up to make room for more correct opinions, has remained in the public at large; and it is to be feared that it will not soon be removed. And it would be fortunate if this prejudice were confined to the public. But unfortunately it still lingers in the Medical Profession, and it is for this reason that I have dwelt upon it so lengthily. Nothing is more common than to hear doctors of medicine, young and old, in cases of infantile disease, diagnosticate teething, after mother and nurse have done so before; and nothing is more frequent than to be told that the death of a child was the consequence of dentition. I have seen, in this city, a certificate of death, in which the direct cause of the death of a child five years of age, with his jaws full of teeth, was attributed to teething. Consider for one moment the absurdity of the conclusion that a normal, physiological process is fatal to the existence of a living being. Who has ever ventured to assert that menstruation, or pregnancy, or the climacteric years, are the direct causes of death? It is equally absurd to assert it of dentition; yet such statements are daily made by physicians. According to the census of England, in the year 1857, there were in the United Kingdom 3,992 deaths from teething, 3,791 of which curred in children of less than two years of age, and 201 in children of from two to five years old. Between the years 1845 and 1850, there have died in London, according to the report of the registrar-general, no less than 3,466 infants from teething, and the disorders caused by the general irritation attending dentition; the total number of deaths from all causes being 258,271, giving the proportion of one death from teething to seventy-four from all causes. And the census of the State of New York offers the following numbers: In the whole State there died, in the year 1855, from teething, 626 children; of these certificates of causes of death, 254 were made in New York County, 132 in King's, 35 in Erie, 24 in Rensselaer, 41 in Albany, 30 in Monroe.

It is not stated whether a part of those unfortunate children who died from teething had not the full contingent set of teeth of first dentition.

Let me first state that teething, in the common acceptation of the term, is not the gradual development or formation of teeth, but the time and act of their penetrating the gums. This takes place, in the average, beginning from the sixth, seventh, or eighth months to the twenty-fourth or thirtieth month of life. I may also in this place enumerate the symptoms which are often observed during, or (shall I say?) in consequence of teething. In a large number there are no symptoms at all. The first, and the second, and perhaps all the other teeth, will cut, and without any disease or trouble of any kind. In others the mouth is hot and red, with the exception of those thin parts of the gums below which the teeth are visible; even the lips have a higher colour and temperature: the child puts its fingers, or anything in its reach, into the mouth; is pleased with having its gums rubbed; bites the nipple when sucking; or if the mouth is inflamed and aphthæ are present, and the tonsils swollen, it is disinclined to take the breast, trying it often, but just as often loosing its hold. At the same time there is a copious salivation, the saliva being usually tough, viscid, and more like mucus than saliva. The child has all the usual symptoms of slight or moderate fever; warm hands, a rapid pulse, flushed or pale face, intense thirst, vomiting, constipation, or diarrhœa, with green mucous passages. The most common of these is diarrhœa. Pain in the bowels is very common, as digestion appears disturbed; tears are secreted abundantly; the blood-vessels of the conjunctivæ are injected. A slight cough, hoarseness, pain in passing the scanty urine, secretion from the nose, are not unfrequent occurrences. Such symptoms are apt to disappear entirely in three or four days or a week, with or without treatment. But sometimes the symptoms are graver from the beginning, or they are aggravated by endemic or epidemic influences, or the peculiarities of individual dispositions to disease.

In some cases the fever will not disappear so readily without leaving grave consequences: the pulsations of the heart and arteries will not decrease in number; the action of the heart will not be of less power and impetuosity than before; the tongue, mouth, and lips remain dry; thirst so extreme that you cannot take the tumbler from your little patient's hands before he has completely emptied it. Respiration is accelerated, numerous, short, and superficial. The eye is sensitive to the light; headache becomes manifest from the corrugation of the muscles of the eyebrows, and the peculiar aspect of suffering. Excretions and secretions are scanty, fæces dry and hard, urine red. Vomiting and diarrhœa, if they had been present before, now cease. The child will appear more depressed, but easily excited; slight local convulsions will prove the introduction to severe attacks, which generally terminate fatally. In other cases the tongue is hard, dry, black; teeth and lips of the same colour, corresponding with the symptoms characteristic of typhoid fever. Such cases are very likely to terminate fatally. The last symptoms in such cases are paralysis of some abdominal organ, especially of some part of the intestine. Another train of symptoms attributed to teething is the following: A child is feverish; pulse frequent and small; temperature of the extremities considerable; but the face is pale from the beginning; lips and mucous membrane of the mouth hot, red, and dry; tongue covered with a greyish white fur; restlessness, anxiety; respiration hurried and short; vomiting and diarrhœa. Frequently such a depression of the general strength is combined with these symptoms—the more so as the most intense and often-repeated vomiting and diarrhœa are very apt to exhaust the little patients—that the child dies in a day or two in convulsions consequent upon inanition, and local or general paralysis. In a certain number of cases the principal symptoms cease, and the child recovers. In a certain other number vomiting will stop, but the diarrhœa continues. The deluded mother, who felt a little uneasy at the severe character which teething seemed to have assumed, is gratified, after the main symptoms have passed by, to find that her child is suffering from diarrhœa only, and that in this manner teething will be made easy and comfortable. But, alas! this deception on the part of the mother is too often fatal to the child. The diarrhœa is allowed to go on for days and weary weeks; the digestion becomes hopelessly destroyed; the abdomen immensely distended with gas; the mesenteric glands swollen and impermeable to chyme; the catarrh and over-secretion of the glandular follicles of the intestine lead to deep ulcerations of the intestinal canal; the diarrhœa becomes also more frequent, serous, mucous, or bloody; the arms and legs of the little sufferer dwindle away; and the countenance becomes emaciated and senile. The scene closes with a consoling certificate from some doctor or druggist, affirming that teething was the cause of death. Thus millions of infants are destroyed by ignorant, prejudiced, and incorrigible advisers. I say incorrigible. I know that mothers will always consult their prejudices first, the prejudices of their neighbours next, perhaps at some late time common sense, and finally they may seek the advice of an educated medical man. I know that a mother who has just consigned a beloved child to the grave, will go home with throbbing heart, and repeat the follies which cost her the child she has lost. If you remonstrate with her for neglecting the second, as she did the first, she will reply, Was not the child teething? Would you prevent the child from teething naturally? Is not teething necessary? Was it her fault that the child got teeth with difficulty? The true inference would be that nature neglected much, and that it was greatly at fault in the matter of dentition. I once read the newspaper announcement of the death of a child, in which the parents, while inviting all their friends and acquaintances to attend the funeral, affirmed that "the Lord hauled the dear child up to heaven by the teeth." Now, in this case, neither the father nor mother was at fault.

I shall not, in this place, proceed to point out the other symptoms of diseases attributed, whether rightly or wrongly, to teething, as the symptoms of cerebral inflammations, of convulsions, of general and local paralysis. At a later period in this course of lectures, I shall return to these subjects for practical purposes. It will better answer my design to give you a sketch of what dentition is, anatomically and physiologically, in order to show clearly the normal and abnormal course it may take. I shall thus be able to explain and *limit* the numberless complaints generally attributed to teething. If I can relieve your minds of the impression that dentition destroys the thousands and even tens of thousands of innocent beings who are yearly sacrificed in reality to the prejudices of other times, I shall be abundantly satisfied.

TREATISE UPON THE GENESIS AND DEVELOPMENT OF THE DENTAL FOLLICLES TO THE EPOCH OF THE ERUPTION OF THE TEETH.

By Drs Ch. Robin and E. Magitot.

(Translated for the 'Dental Cosmos,' by E. Sureau.)

(Continued from page 74.)

Section 3. *Constitution of the jaws at the time of the appearance of the dental follicles.*—The first dental bulbs appear in the human species in the lower jaw from the fifty-sixth to the sixtieth day, and in the upper one about the sixty-fifth day after conception; that is to say, after the formation of the buccal cavity is completed by the union of the incisives at the mesial line and the partition of the nose behind the dental arch. The various tissues constituting that jaw can then be easily distinguished from each other: first, the maxillary; second, the mucous membrane covered with its epithelium; third, the submucous tissue, which does not differ from the submucous tissue of the neighbouring parts in regard to its anatomic composition and its texture, but penetrates into the groove of the upper and lower maxillaries. It is in the thick part of this that the follicles originate.

We will consider succinctly these three parts, observing them during the earlier periods of the fœtal age, because the phenomena of dentition are more or less directly influenced by them.

I. The Maxillaries.

When the first dental follicles appear, the ossification of the cartilage by which the jaws originate is already much advanced throughout the whole extent of the dental portion—the only part that it is essential for us to consider in this place. The ossification is, however, not complete, especially in the anterior portion, and particularly in the ruminating animals.

The substitution of bone for cartilage being once effected, the growth of the maxillaries continues by the method of ossification called invasion; that is to say, in the same proportion as the cartilaginous substance is developed at their surface, invading the surrounding submucous tissue, it is itself conquered by ossification.

Under the microscope, at a slight increase, the bone of the maxillary, and particularly that of the inferior, is easily distinguished from other tissues by its dark colour and the breadth of the osteoplasts, which appear in the form of small, blackish, star-studded points. If an entire lamina of the jaw is examined, we will see only a solid, dark tissue, slightly areolar at its edges; whereas when we examine a cut at its surface, we find the osseous substance divided into follicles that circumscribe the areolæ, forming most elegant designs. Respecting the cartilaginous tissue (which forms, as before stated, a sort of varnish, by means of the ossification by invasion, on the surface of parts already ossified), it appears in the form of a transparent bed, which it is difficult to distinguish from the surrounding laminated tissue when it is but slightly magnified. The chondroplasts which it contains, when seen under a magnifying power of about three hundred diameters, are pale and triangular, or irregularly polyhedral in shape. In the small cartilaginous lamina that rises above the osseous edges of the grooves, and in the cartilage of the extremities of the organ, the chondroplasts are larger, angular, with the angles sometimes prolonged to a point, and contain one or two finely-granulated greyish cells. The chondroplasts give this cartilage the general appearance of the cartilage of ossification in the other parts of the fœtal skeleton, as it is seen when the phenomenon of ossification is already considerably advanced after birth.

The preceding particularities of texture exist without sensible differences in all the Mammifera.

It is now necessary for us to make a separate examination into the disposition of the inferior and superior maxillaries.

Inferior Maxillary.

At a period which corresponds in man to the end of the second month (between fifty and sixty days), there is no part of the inferior maxillary entirely cartilaginous except the condyle, the posterior part of the angle, and the crown of the coronoid apophysis. All the rest of the organ is ossified, but covered with a cartilaginous bed, only some hundredths of a millimetre in thickness ; it is a little thicker at the edges of the bone than it is on its faces. The same condition of things occurs in the hog, but we have already stated that among ruminating animals the ossification of the extremities and edges of this maxillary are less advanced. The lower edge of the latter is thin and regular. The upper edge of the horizontal or dental portion is furrowed with grooves ; thus it is really double, and each of the edges of the groove is thin and easily broken. The lower maxillary is at this level almost as broad as it is high ; but following its internal structure, it does not offer the resistance that its thickness would seem to indicate.

The groove is worthy of being described with care. It extends without discontinuity from the anterior edge of the ascending branch of the maxillary, encroaching a little on its inner face, as far as the anterior extremity of the corresponding branch of the maxillary ; consequently the whole of its contents can be removed in one piece. Yet almost directly after the appearance of the bulbs this continuity is broken between the molars, canines, and incisors at the level of the *bar* in all the Mammifera that have one. The bone is contracted at this level, and is lower than behind and in front. The depth of the groove is considerable ; and from the time that the bulbs appear it occupies more than two-thirds of the height of the bone, the lower edge of which is thin and regular in comparison with the rest of the organ. In man, however, toward the beginning of the fourth month, the solid part of the maxillary becomes gradually higher than the groove is deep, reckoning from the level of the canine as far as the symphysis.

At the level of the molars, and in relation to the axis of the lower maxillary, the groove is situated inside of the latter, but passes round it in order to be continued on the side of the outer face in the whole portion containing the follicles of the canine and the incisors. The groove is widened, as if swollen in blisters about its posterior third, narrow in front, and more suddenly contracted behind. It opens at the inner face of the ascending branch of the maxillary by a fissure-shaped opening, broadened and rounded at the level of the bottom of the groove, and narrow above, where it soon closes ; there then remains only the lower part of that slit, which forms the *posterior dental foramen*, or posterior orifice of the dental canal, which is traversed by the vessels and nerves of the same name. They make part of the contents of the groove, to which we will return later.

The above-mentioned vessels and nerves creep in a slight furrow at the bottom of the groove ; this furrow is always smooth and regular, and will become, at a later period, the dental canal. From the time of the genesis of the follicles, the inner face of the laminæ or ledges of the maxillary, which limit the sides of the groove, become thicker from space to space in the shape of little vertical projections that stand facing each other on each side. These projections press forward, join each other, and form complete partitions, dividing the groove into cells or alveoli ; but this takes place only at a much more advanced period of development in man: as late as the ninth month of gestation, and even later, we can raise in one piece the contents of the groove, containing all the follicles in it.*

When these partitions are produced, the vessels and nerves pass below them, at the bottom of the groove, without discontinuity, as in a canal under as many bridges represented by the partitions, and soon occupy, as we will see, a true sub-alveolar (inferior dental) conduit.

The rudiments of the partitions always unite, in the first place, between the first molar and the canine, and then between the latter and the second incisor. From the middle or end of the fourth month the first of these partitions already exists in the shape of a narrow, slender, and thin follicle, passing over the vessels at the bottom of the groove. At this period the prolongations are not yet united between the canine and the second incisor, but they become so near the sixth month. They unite between the two incisors near the seventh month, but not between the molars until after birth. Before they are united throughout their whole height, they form a very slender bridge immediately above the vessels. This bridge grows in height by thin, sharp prolongations, that proceed from the walls of the groove toward its middle, and complete the partition after birth.

(To be continued.)

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* If we except some lines of Hunter (1771) upon the subject with which we are occupied, we have not been able to find a description of the inferior maxillary groove where the dental follicles originate. Meckel merely says that, "at the beginning, the inferior maxillary is not yet closed at its upper part, and makes part of the space limited by the two dental edges." (Meckel's Manual of Anatomy.) M. Cruveilhier says that, "from the fiftieth to the sixtieth day, each half of the bone is already furrowed by a groove common at that time to the dental canal and the alveoli ; at a later period, the groove becomes very considerable, and is divided into alveoli by partitions, which are incomplete at first, but afterwards complete ; these alveoli and their partitions occupy the whole height of the body of the bone." In the second or third month we find that the jaws " are furrowed by a broad and deep groove, divided by very thin walls into as many distinct cells or alveoli as there should be dental germs." (Anatomie Descriptive, Paris, 1843, vol. i., pp. 185 and 590.)

PROCEEDINGS OF DENTAL SOCIETIES.

COLLEGE OF DENTISTS OF ENGLAND.

MONTHLY MEETING.—February 5th, 1861.

Dr Purland in the Chair.

The Third Monthly Meeting was held on Tuesday, February 5th, the Chair being occupied by Dr Purland.

The Minutes of the last Meeting having been read and confirmed, Mr Williams announced the following donations to the Library and Museum of the College:

Mr Vidler—Bell's Anatomy, 3 vols.

Mr Dobie, of Paisley—Two casts exhibiting imperfect dental development, accompanied by the following description :

"No. 1 is a cast of the lower jaw of a boy, about five years and six months old at the time the impression was taken. There are six teeth deficient, viz., the four incisors and two cuspidati. He is a stout, healthy boy, and there is nothing peculiar in the teeth of the superior maxillary ridge ; they are well developed, and were presented at the usual time. The boy's father (who is a Surgeon) consulted me about two years ago upon the case : on examining the bone, I came to the conclusion, judging from the narrow and square appearance of the alveolus, that the rudiments of the teeth were not there, and that he would not have either the temporary or the permanent teeth. Mr Goodsir, who was consulted subsequently, came to the same conclusion.

"No. 2 is the cast of the lower jaw of a young man about twenty-eight years of age, of a nervous lymphatic temperament ; he enjoys generally pretty good health. Besides the want of the four incisors in the lower jaw, there is a deficiency in the upper of the first bicuspis, and the temporary molar is still remaining.

"It is interesting to compare the two casts. You cannot but be struck with the great similarity of appearance ; they have the same thin, knife-like ridge, and the same squareness instead of the regular arch an ordinary jaw usually presents. It gives a peculiar appearance to the face, allowing the lip to fall in, and giving an expression of age which is most remarkable in the child."

The thanks of the Meeting were accorded to Messrs Dobie and Vidler for their donations.

Mr Waite exhibited two sound bicuspid teeth, which had been extracted in consequence of nervous irritation in the course of the fifth pair of nerves, and which appeared to have depended upon a somewhat singular development of the fangs of the teeth.

Mr Hulme exhibited the casts of the upper and lower jaw of a woman about thirty years of age. In the upper jaw, two supernumerary teeth were developed in the centre of the mouth, and had thrust aside the central incisors, which stood nearly at right angles to their normal position. In the lower jaw, the second bicuspid on either side had taken on a most abnormal and curious development. That on the right side was attacked by caries on the crown, and had in consequence been extracted, and was exhibited at the Meeting. The fang of this tooth presented nothing peculiar, but the crown was as large as that of a permanent molar, only it was of a more rounded form. By a careful examination, the normal form of the bicuspis could be traced; but it appeared as if some internal action had caused the germ of the tooth to become expanded, and had thrust apart the labial and lingual surfaces of the tooth. Whatever this cause might have been, it must have taken place before or during the formation of the dentine, and anterior to the deposition of the enamel, since the external surface of the tooth was uninterrupted, and invested in the usual manner with enamel. Mr Hulme also exhibited a cast of the lower jaw of a child, in which the second temporary molar bore a very strong resemblance to one of the permanent grinders.

Mr FELIX WEISS then read a paper "On the Application of Hardened India-rubber to the Manufacture of Artificial Teeth." He commenced by pointing out the importance of examining all new substances suggested as applicable to Dental mechanism, which he enforced not alone as a necessity, but as a duty. He briefly detailed the history of vulcanite, and glanced at the various patents which had been taken out to facilitate the working of the process. He then proceeded to describe a variety of experiments made with the dry method. Having given a general description of the manner of arranging the teeth for vulcanite work, he showed that the whole secret of success in vulcanising depended upon the regulation of the heat,and laid down such rules as to temperature and length of time in hardening, that, if attended to, would generally ensure success. The method of vulcanising in metal was next explained, and its advantages over the plaster process illustrated: the process, however, was shown to be very uncertain with some rubbers. He concluded his description of the dry methods by pointing out some of the inconveniences connected with that process, principally to be attributed to the variation of temperature in different parts of the chamber. He contended that the only true method of arriving at a correct register of the heat of the flask, was by having a metal cup fixed to it, and filled with oil, which the thermometer is made to dip into, having passed through the lid of the vulcaniser. When a piece had been successfully vulcanised by the dry method, he could not discover any difference, either in hardness or colour, from that done by steam. If the piece should prove brittle, this was to be attributed to its having been over-baked or done too quickly.

In speaking of the hardening of india-rubber by steam, he agreed that, for simplicity of action and certainty of execution, the process could not be surpassed. Mr Putnam's Vulcaniser (the first introduced into this country), Mr Childs' Superheated Steam Apparatus, and others generally in use, were then noticed. The writer shortly described the difference betweeen superheated and saturated steam, and showed that in their results they were the same. He entered upon the various effects produced by raising the heat suddenly and gradually, and cooling rapidly and slowly. The chemical characters of vulcanised and unvulcanised rubbers were noticed, and the changes of composition that took place were explained. The Author next entered into a minute examination of all the rubbers in general use, and exhibited a specimen of eight varieties vulcanised at the same time; and, after advocating many improvements in manipulating, describing various methods of mounting upper and lower sets, concluded with an explanation of all the new apparatus introduced, and summed up the merits of the different processes with a general review of the cases in which he considered vulcanite could be advantageously used, contending that it was in no way applicable to every case.

The paper was fully illustrated by specimens and diagrams, showing the failures resulting from over-heating, &c., and the success that attended a true knowledge of the process.

A very animated discussion ensued; but as the subject was one of great interest, it was decided that the further discussion of the paper should be adjourned to the next Monthly Meeting.

MR HULME'S LECTURES.—Mr Hulme's third and concluding Lecture on Diseases of the Dental Periosteum was delivered on the evening of Tuesday, February 26th. The present lecture was occupied with the consideration of the hard structures which are formed around the fang of the tooth through the agency of the periosteum. After referring to the condition of the long bones, and showing that in these parts of the skeleton the periosteum assisted in forming the outer layer of the bone, the Lecturer showed that the same thing took place around the fang of the tooth; the periosteum became thickened, and might be divided into two layers, and it was through the agency of the inner layer that those formations known as extosis were developed on the fang of the tooth. The structure and characters of these formations were fully explained, and illustrated by numerous diagrams and specimens. Cases were quoted, showing the severe neuralgic and other symptoms which these growth occasionally give rise to, and some very remarkable examples of teeth which had never emerged from the sockets in which they were developed, and which had in consequence given rise to morbid growths necessitating the removal of a large portion of the jaw. At the close of the lecture, a vote of thanks was proposed by the President and unanimously accorded to the Lecturer.

CERTIFICATE OF MEMBERSHIP.—The following are the names of gentlemen to whom Certificates of Membership have been granted during the past month:

Dobie, James, Paisley, Scotland.
Dubois, Adolphus, Charlotte street, Fitzroy square.
Ferguson, James, Sligo, Ireland.
Gamble, J. G., Stratford-on-Avon, Warwickshire.
Howlden, William Henry, York.
Phillips, Thomas, Davies street, Berkeley square.
Pike, James Lee, Dumfries, Scotland.
Sims, Frederick John, Birmingham.

THE next Monthly Meeting of Members will be held on Tuesday, April 2nd, when a paper will be read by Mr G. WILLIAMS, on "Artificial Palates." Mr HULME will preside on the occasion.

ODONTOLOGICAL SOCIETY OF LONDON.

ORDINARY MEETING.—FEBRUARY 4TH.

W. M. BIGG, ESQ., PRESIDENT, in the Chair.

THE Monthly Meeting of the Members of the Odontological Society was held on Monday evening, February 4th, 1861; the PRESIDENT in the Chair.

The paper read was by Mr CARTWRIGHT, on "Disease and Treatment of the Pulp."

After describing the general anatomy of the pulp, the Author remarked that the pulp may be affected in three ways without manifesting symptoms of inflammation: irritatively, but without contact with decayed bone, probably by infiltration or nervous communication through the organised contents of the dentinal tubes; irritatively, but in contact with decayed bone; and irritatively from positive exposure to external influences.

Teeth presenting good structural features, and which belong to a sound constitutional diathesis, are more likely to be treated successfully if decayed, and if decay has progressed so far as to implicate the pulp; but where their structural formation is indifferent, and the general condition of the system shows want of tone and power, the chances of inducing by local treatment the calcifying of the pulp is very problematical. The writer referred to a lower molar tooth which he had stopped for a lady twenty-two years of age. When it was removed five years afterwards, he found that the pulp was three parts or more ossified, with one piece of irregular and several isolated nodules of secondary dentine; the cavities and canals of the roots were filled with thick and offensive fluid, the residue of the decomposed remnant of the pulp. He considered that drilling into the pulp cavity would have relieved the symptoms.

Speaking of destruction of the pulp and subsequently filling the cavity, the writer had found it succeed, but most so where ample time had been allowed to elapse between the period of destroying the pulp and the insertion of the permanent filling, the time varying between two to six and eight months. This treatment had succeeded better with upper than with lower molar teeth, and, as might be expected, with single-fanged teeth than with bi- or tri-fanged teeth.

Of the escharotics used for destroying the pulp substance, there is none that seems to answer so well as arsenic, either used alone or in combination with essential oils—creosote or oil of cloves—and morphia. The writer then referred to the various methods which have been proposed from time to time for the treatment of exposed or of inflamed pulp—Dr Hallihen's plan of drilling into the pulp cavity at the neck of the tooth; that of Mr Barrett, who inserts a tube with a piece of gold plate soldered to one end, and places it over the opening into the pulp cavity. He then fills over this shield and around the tube, so that an artificial opening is formed for the escape of fluid; capping over exposed pulps with various substances—a practice which Mr Thomas Rogers had found successful in one-fourth of the cases he had so treated.

The Author strongly advocated Dr Hallihen's system of drilling into the pulp cavity in cases of peridental inflammation after stopping. Within the last three or four months, he had treated numerous teeth in this manner, and in every instance obtained relief within a short time.

A lengthened discussion ensued, in which Messrs Harrison, Rogers, Tomes, Drew, and Walker took part. The opinions expressed by the different speakers upon the question of destroying or preserving the pulp in teeth where the decay was far advanced, were of a very conflicting character.

PENNSYLVANIA ASSOCIATION OF DENTAL SURGEONS.

A Monthly Meeting of this Association was held on the evening of January 8th, 1860, at eight o'clock; the President, Dr **Dillingham**, in the Chair. Present, Drs Suesserott, Van Osten, M'Quillen, Fitch, Buckingham, Roberts, Barker, and a large number of students of the Pennsylvania College of Dental Surgery.

The subject of discussion, being "The Abnormal Conditions of the Mouth during Childhood," was opened by Dr BARKER, who said that in considering the subject we must first trace the causes which produce these abnormal conditions, and this would bring us as Dentists to the most fruitful one, viz , interupted or difficult dentition, which may be due to many different influences. In almost all cases of teething there is more or less constitutional or local disturbance, the saliva being increased, with hot, turgid, and swollen gums over the advancing teeth ; these symptoms, however, differing in different constitutions. Not unfrequently cerebral or intestinal derangements are present, that unless speedily removed will induce the death of the little sufferer.

He considered there was a lamentable ignorance prevalent with parents that dentition must necessarily produce constitutional disturbances, and as a consequence many were allowed to die when the simple lancing of the superimposed gum over an advancing tooth was all that was required in the early stage of the disease. He doubted not the returns of mortality presented in the reports of deaths of children under three years of age would be greatly lessened if parents could be taught the importance of early attention to the disturbances, the result of interrupted dentition.

He believed in lancing it was advisable to use a rough, saw-edge gum lancet, as there would be less danger of hæmorrhage ; besides, the roughened surfaces of the wound would not unite as quickly as if made with a sharp one; and remarked, with children of scrofulous diathesis who were teething, pustular eruptions were nearly always present.

He referred to the abnormal condition of the mouth, the result of caries or alveolar abscess of the temporary teeth, considering it the duty of every Dentist to preserve the deciduous teeth by temporary fillings, that they may remain as long as necessary in the mouth, and also prevent the difficulties arising from exposed and inflamed pulps and alveolar abscess. In lancing for the evacuation of the pus in the latter disease, he adopted the method of separating the gum and tooth with the lance in the same manner as previous to extraction, instead of passing it alone through the gums. The opening will not be closed, as Dr Hunter observed the gum would never again become permanent to the tooth ; while, in the other method, the wound would unite after the removal of the pressure of the pus, and subsequently the same difficulties would again occur.

Dr SUESSEROTT did not consider teething a predisposing cause of disease, as it is a physiological act ; for if all of the functions are properly performed, we need never expect any difficulty or derangement of the economy during the performance of this, one of the most beautiful operations of nature. If, on the other hand, we find some constitutional or local cause producing a derangement of the system and weakening any particular part of the mechanism, we find the normal afflux of blood to the dental structures heightened to an abnormal irritation, and thus the act of teething is made to be an indirect *developing* cause of disease. A *predisposition* to disease existing in any structure of the animal economy, the performance of any natural function may be converted into a *developing cause.* Even the essential and beautiful function of nutrition may develop disease in a part that is predisposed ; yet no one is ready to admit that nutrition is a *predisposing* cause of disease.

Dr M'Quillen said, while recognising dentition as a physiological condition, must we not admit in addition, that interruption of that function is a prolific cause of disease with children? Utero-gestation is a physiological condition, and yet by the derangements produced in the system under such circumstances, latent diseases are not unfrequently developed in the pregnant female. Carious teeth in particular, which have remained in the mouth for years, causing little or no annoyance to their possessor, frequently become exceedingly painful, taking on either odontitis or periodontitis.

The speaker then referred to the difference between the *predisposing* and *exciting causes* of disease;—the *first* or *predisposing* cause being a peculiar condition of an organ or part of the animal economy, rendering it liable to take on diseased action when exposed to the influence of the *second* or *exciting* cause. Interrupted dentition he was disposed to regard as an *exciting* rather than as a *predisposing* cause of disease. In illustration of this, attention was directed to the different results flowing from difficult dentition, according as the child was predisposed to cerebral, pulmonic, or intestinal disturbances.

He had no experience to offer in the treatment of cancrum oris, but would direct attention to an agent (the chlorate of potash) which is regarded by many Practitioners as a specific in that disease; the quantity prescribed in the twenty-four hours varying according to the age of the child, from twenty to sixty grains in divided doses, given every four hours.

Dr Fitch referred to the abnormal conditions of the mucous surfaces of the oral cavity, considering many of them to be due to constitutional causes; they would, therefore, require constitutional treatment. He believed it to be the legitimate province of the Dental Practitioner to properly treat such cases, and that he should possess the necessary requirements to fit him for such duties. He spoke of abnormal conditions which were due to vitiated habits and faulty nutrition—such, for instance, as cancrum oris, which was only met with in the children of the most uncleanly and depraved classes. The treatment called for was first to supply proper food, to change the vitiated condition of the blood, also commanding strict cleanliness to be observed. As a local application he believed zinci sulphas was generally recommended. He had met with cases where there seemed to be hereditary tendencies to diseases of the mucous surfaces; but they were usually present in children of strumous habit, who were badly fed, and did not get sufficient pure air and exercise. In lancing gums for children, he preferred the crucial to the straight incision, considering it far more effectual in accomplishing the object desired.

Dr M'Quillen directed attention to the influence of the season of the year upon children during the period of dentition: thus difficult dentition during the winter is very likely to excite pulmonic derangements, while in the summer intestinal disturbances are most likely to supervene. With regard to the importance of making crucial incisions over the molars, he stated that a single incision, either backward or foward, or from side to side, was not sufficient to remove the pressure of the gum upon the protruding tooth, but that it required the incisions to be made in both directions.

In conclusion, he alluded to the practice children sometimes indulged in of chewing matches, and had reason to believe that such a course was calculated to develop phosphor necrosis in their jaws. He recalled an interesting specimen that had been shown to him by his friend Dr Calais, in which necrosis and exfoliation of a large portion of the alveolar process of the lower jaw, including several of the deciduous teeth and the half-formed permanent teeth below, was attributed to the fact that the child had been frequently seen with matches in its mouth.

A lengthy discussion upon what was the legitimate province of the Dental Practitioner was entered into by Drs Buckingham, Fitch, M'Quillen, Barker, and Suesserott.

The following was chosen as the subject for next discussion:—"The Systemic Causes interfering with the Development of the Permanent Teeth."—'Dental Cosmos' for February.

CORRESPONDENCE.

TO THE EDITOR OF THE 'DENTAL REVIEW.'

SIR,—I read with mingled feelings of interest the communication in last month's REVIEW by Mr Felix Weiss, M.C.D.E., on what he calls "Dental Empiricism, Past and Present;" and as he has made it an open question, and guards the public, I humbly, through your impartial REVIEW, wish also to let the said public behold the opposite mirror. Now, Sir, I feel, and I think rightly and justly, though I have not the honour of having M.C.D.E. to the end of my name, and not having ascribed to that honour owing to College rules against advertising, &c. &c., that what Mr Weiss there asserts is decidedly on principle wrong. First, he strongly condemns advertising. Good. So would I, when it is made the *medium* of *wrong:* but what the *actual simple* act of *advertising*, in any way a Dentist thinks BEST to enhance his professional labours, has to do with his fitness or unfitness for a Dentist, or for his honesty or dishonesty, I really cannot fathom. Will a College Certificate or Membership make him a conscientious and honest Dentist? Common sense answers, No! it rather shields him. Then what, in the name of that common sense, is a young practitioner to do, who having no connection or capital to make things meet till the patients begin to come in, from the half-dozen Mr Weiss so kindly allows—I say again, what is he to do? If he *attempts* to take an establishment, or even private apartments in a good private street, and thus expects practice from the *recommendation* of the *half-dozen*, I beg most truly to inform them and Mr Weiss that not only will melancholy soon mark him for her own, but there is a strong chance of the parish workhouse authorities having to act as his guardians. Is this not even the case with a clever man who trusts to the *slow* recommendation of a *select few*, who, every practitioner knows, are at the best of times swayed by various motives: some do not like it *even known* they *wear* false teeth, others that they know or have been to a Dentist, some from carelessness and forgetfulness in recommending, &c. &c.;—all these acting together, if he wishes or wants to make a practice in the present mushroom-like growing age of Dentists, he MUST advertise in *some way*. Again—I ask, why is it "alike disreputable and dangerous to society?" Would any man except a *fool*, who advertises, advertise *but* to see his patients *once?* I say, no!—common sense, commercial sense dictate, no! The fisherman catches the fish to sell in the market, and they are caught by the *same net* over and over again; the fisherman is no fool—he does not by any manner of means dispel the illusion or delusion of the finny inhabitants of the deep, by showing them what fools they were and are, "past and present." No—

the *meaning* is upright and honest, so sure will be the issue. Again—why on *principle* should a Dentist who does not wish to hide his light under a bushel by advertising, necessarily be condemned as the *inferior* practitioner or a dishonest one? This is almost too absurd and egotistical to refute; yet how often, in our age, do we see the itinerant salesman vending purer, cheaper goods than the more mighty and *seeming* upright! So it is with Dentists—no matter by what means they bring themselves forward from the host, *if*, when they have got a *patient*, they would only serve *them* as they would *themselves;* this is the real hinge of honesty, of good commercial sense, and success cannot fail to follow. So I say—say to all *honest* men—advertise if you can; if not, try my second object of argument, and Mr Weiss's horror, the modern Dental Show-case, of which he writes—"Another mode of gaining notoriety, or, more correctly speaking, of attracting attention, is by the show-case, which we must also unhesitatingly condemn,"—but, alas! on what weak and feeble grounds!—viz.," the show-case does not necessarily contain specimens of work executed by the exhibitor." Hum! rather dangerous ground for vindication. Pray, may I be allowed to ask Mr Weiss *how many* Dental Practitioners—private and honest *ones* I mean, no vulgar show-case exhibitors and advertisers—*execute* the *work with their own hands* which they put in the mouth? It would be rather difficult and unpleasant to answer it truthfully, but I will:—Why, *very few.* The majority, dear public, and my most approved and very good masters, employ *workmen* as other callings do, and pay them salaries according to skill, as other callings do; so that oftener than otherwise they, the principals themselves, apart from some PET operations in the surgery, are no more good practical mechanical Dentists than the instruments they handle. How many who write up *Watch and Chronometer Makers*, and Jewellers, ever made *one*, much less the *other?* So in many trades and callings, of which the principal's extent of knowledge of his calling is next to nothing. And here I may well quote the words of Sydney Smith—"Other rules vary, this is the *only* one you will find without exception—that in this world the SALARY, or reward, is always in the inverse ratio of the duties performed." Therefore, no more than that in the majority of cases the show-case contains specimens of work executed by its exhibitor, so no more also, in the majority of cases, is the work put in the mouth by private Dentists, work executed by the principal. So much for the assertion, and that the show-case does not necessarily contain specimens of work executed by its exhibitor. Many, it will be said, cannot find time to do their own work. Well, it is immaterial, and the good public can believe whichever assertion they like; only do not let them delude themselves with the idea, should the January number of the DENTAL REVIEW for 1861 get into their hands, and they read the article on "Dental Empiricism, Past and Present," that simply because a Dentist exhibits a show-case or advertises, he *must* necessarily be the dishonest and inferior practitioner; or that because the other side have a very small plate on their doors, with the name engraved small, and the calling smaller—sometimes without—it must necessarily follow they *must* be the superior practitioners. Both are likely to be good, both are likely to be bad: therefore, from the good of both sides, the good must "go forward in the good cause, *unintimidated* by the scepticism of the faithless, the *fear* of the timid, or the *apathy* of the selfish." Again—there will be empirics in every calling under heaven; therefore, the public must trust to the Dentist being, apart from a Dentist, an honest man: if he is one, they have nothing to fear, *even* if he advertises or exhibits a show-case, or *does* not. I am not afraid to say I have advertised;

I exhibit show-cases, but most respectfully intimate that from the show-case to the smallest specimen or fittings in it, all was made NECESSARILY with my own hands *alone*, and through so doing doubt much whether my patients would get *better* or more *conscientiously* served if I were a *private* practitioner.

I cannot conclude these remarks, Mr Editor, without blushing for the, I may say, illiberal *remarks*,—"Let every *enlightened* member [God forbid!] of the Profession in his private capacity [worse still] take every opportunity of impressing upon society the necessity of a charter . . . . and endeavour to inculcate a thorough distrust in advertised [and show-case—inadvertently left out] ability." If there are black sheep—and nothing *will* or *can* prevent them—I beg to inform Mr Weiss and all co-workers in Dentistry, that silently, steadily, without censure, return good and honest work—do the duty, apart from Dentists, of honest men, and this course will go far to convince the patients, so ultimately educate the public, and will lay a far more secure and lasting foundation to upset all unprincipled Dentistry than all the idle tirade and windy aspirations, whether public or private. Give praise where it is *due*, otherwise let a silent tongue show a wise head. Mr Weiss admits himself the College rules, &c., help the empiric, and give him a larger field. Of that there is no doubt: there are a great many good, honest members of the Dental Art, both in town and country, who advertise, exhibit show-cases, &c., and to whom the College is forbidden ground, and to the members themselves what is the result? Why, they will have acquired a competent Dental study, no doubt; but too surely will that prove a dead letter against the more pushing, striving, advertising Dentist, especially if he is honest and takes care to serve his patients well, so as to SEE them and their recommendations again and again. And, sadder still, but too often will the College *education* have to submit to perform *workman's duty* to the very practitioners to whom it is *now* forbidden ground. But that is the business of the College, not mine.

With, Mr Editor, my best thanks for your impartial hearing,
I remain Sir, your obedient servant,
GEORGE WARD.

37A Bloomsbury street, Bedford square, W.C.
February 7th, 1861.

TO THE EDITOR OF THE 'DENTAL REVIEW.'

SIR,—I deeply regret that the Editor of the 'British Journal of Dental Science' should have done you the injustice to associate my letter of last month with your editorial article. I certainly cannot lay claim to the honour of those ably-written papers, and I have no wish that you should be rendered responsible for any of the intemperate expressions which the January leader of the 'British Journal' called forth.

I confess I am one of those who consider it is useless to sprinkle otto of roses over persons who pelt you with mud. It is not, however, upon such grounds that I should attempt to justify the expressions I have made use of. I defend them as simple statements of facts. If a person wilfully misrepresents you, is it too much to call it by its right name, and say it is an atrocious calumny? or is ridiculing a man's personal appearance to be termed anything but personal slander? Every reader of the 'British Journal of Dental Science' and of the DENTAL

REVIEW is well aware that these things have constantly occurred; and if that is the case, I ask whether I have designated them correctly or not.

It is a sorry subterfuge by which the writer in this month's 'Journal' bolsters up the leader of his coadjutor, and it seems a pity that he does not keep a more careful supervision over the productions of so obscure a writer. I can only say that before writing my last letter I consulted several persons altogether unconnected with the Dental Profession, and tolerably well acquainted with their mother-tongue, and they unanimously interpreted the obnoxious passage as referring to the College of Dentists.

Let, however, the interpretation that is now put upon the article in question be accepted, let the Street Directory be examined, and I would ask the Editors of the 'British Journal' to point out the Barbers and Blacksmiths who are there enumerated as Dentists. Again, if these persons did not belong to the College of Dentists, how could it have assisted the Council in obtaining the 6,000 signatures of the Medical Profession against the Dental Certificate of the College of Surgeons?

Lastly, Sir, I will ask whether a body of 130 Dentists (these do not include Associates) are correctly described as three or four gentlemen wholly unknown to fame, two or three gentlemen of considerable standing, and of their workmen, pupils, and personal friends in the provinces. Do the holders of the Dental Certificate number as many?

The writers of the 'British Journal' would do well to remember that those who live in glass houses should not throw stones; and, above all, let them bear in mind the Eastern proverb, that "slanders, like young chickens, go home to roost."

I remain, Sir, your obedient servant,

A MEMBER OF THE COLLEGE OF DENTISTS.

February 24, 1861.

TO THE EDITOR OF THE 'DENTAL REVIEW.'

SIR,—The letter of "A Member of the College of Dentists" in your last issue so sufficiently answered the very offensive editorial article in the January number of the 'British Journal of Dental Science,' by holding up the mirror of truth to the self-satisfied countenance of the Editor of that unique 'British Journal,' that any remarks from so humble an individual as myself would have been totally uncalled for, had it not been that the "Member's" letter, together with your editorial article, has had the effect of drawing forth a reply from the Editor of the 'British Journal,' in which he somewhat unhandsomely asserts that "the cap on *this occasion* at any rate was not meant for *you* or *your* party."

Now, if the unmanly, not to say ungentlemanly, abuse contained in that editorial article was not intended for you, Sir, or your party, it will be well if we endeavour to discover for whom it was intended. I will glance at the introductory portion of the article in question, where the Editor volunteers the observation that "it is long since a new year has opened with less to excite our anxiety for the future, or with such promise of political tranquillity in our Profession, than the present one;" but which promise, the bellicose Editor informs his readers very shortly after, shall not be realised, as he, in his plurality, cannot think that to be peaceable would be to take a correct view of the present position of affairs. "*His empire is not peace;*" although he immediately after sinks into an oily state of self-content, having, as he says, "little more to obtain or wish:" and then follows the old story of what fine fellows "we are," with our Board of Examiners and our Diploma, "depending for its value, not upon any superficial appearances of flourishing caligraphy and supposititious coats of arms, but upon the six names attached." I wonder what Diploma *does* depend upon its flourishing caligraphy for its value? What Diploma does the Editor allude to? Why don't he speak out? Is this a *cap* to fit anybody at all; or is it some weak emanation from the substance within his own cap? Passing on through a stale heap of self-laudation, in which a kindly sop is thrown to our "American brethren," the writer of the article thinks that "we may fairly repeat, there is left but little for us to desire," &c. &c. This happy state of content, however, is suddenly disturbed by the recollection that the interest of the readers of the 'British Journal of Dental Science' would be neglected if the Editor should forget to state, that there is "a party which, although it represents the Profession neither in respect of numbers, education, nor intelligence, yet is the exponent of those who, for purposes best known to themselves, throw aside the rules which bind honourable men in dealing with disputed questions." To whom does the Editor allude to in this paragraph?—what head is *this cap* intended to fit?

Proceeding onward through this literary gem, we find that the writer has some idea of a disagreeable "London Correspondent" who writes naughty communications about Dental matters in London to the Dental journals in America, in which his (the Editor's) party, it would seem, does not sufficiently shine, but which would shine very much indeed if our Transatlantic brethren would only come and see. Then follows a repetition of the *gentlemen* in the Odontological Society, the Dental Licentiates of the Royal College of Surgeons, and nearly all the *weight* of the Profession. But here, as in all instances of the Editor's trumpet-blowing, follows a reverse to the picture: their own list, he says, "does not show so lengthened a roll as for the credit of Dentistry he could wish; still it contains nearly every Practitioner, Metropolitan and Provincial, whose name is known beyond his own immediate circle." This is certainly very modest; but what think ye of this, ye benighted Dentists who do not belong to the Odontological Society? "If *any other published list* of individuals who designate themselves 'Dentists' be scrutinised with ordinary care, it will be found to consist (after excluding Chemists, Barbers, Blacksmiths, Photographers, &c.) almost entirely of *ci-devant* workmen—good mechanics it may be, but, with their present attainments, unable to hold the position of Professional men and of advertising Dentists." Now, Sir, before proceeding farther with this analysis, I must halt to inquire what list is here alluded to. Your correspondent "A Member of the College of Dentists" evidently thinks that the list of the College of Dentists is the one. I must own that I laboured under a like delusion, and am not quite clear upon the matter now, although the Editor of the 'British Journal of Dental Science' "has generously wasted his time in explaining to his illogical contemporary that the College of Dentists was not alluded to." What does that luminary say in explanation? First, that the point which he discussed in the January article was "the truth, or not, of the assertion that the PROFESSION is in a divided state." Now, supposing that such a question *had* been discussed in the article alluded to, all that could have been said of such a discussion would be that it was simply stupid, for no man in the Dental Profession has doubted its divided state ever since its unity was opposed by the *weight*, &c. of the Profession: but I deny that there is any discussion of that point at all; the whole article consists of alternate boasting, self-laudation, and slanderous insinuations, if not direct libel on other Dentists who differ politically from the writer. The other published list alluded to, we are told, meant the names to be found in any published Directory, under the head of "Dentists," "Chemists and Dentists," &c. &c. This statement is, to use a homely phrase, "as clear as mud." I should like to know what list of Dentists published in a Directory would not, as far as it lay in the power of the proprietor, be as complete as possible, and consequently not only contain the Chemists, Barbers, Blacksmiths, &c. &c., but also that *weight* of which so much is made in that January article. What would the six gentlemen who compose the Board of Examiners say if their names were omitted from such a list? What would that "staff of officers of acknowledged *weight* and reputation say if they were omitted? What would "the gentlemen who compose the Odontological Society, and who discuss all the scientific subjects of the Profession, with a daily-increasing library and museum, &c. &c.," say if they were omitted from a professedly perfect Directory list? Would they be pleased with such an omission? And if such omission would not—could not be made in the list, must we then, after excluding the Chemists, Barbers, Blacksmiths, &c. &c., find that *nearly all* the rest are unfit to hold the position of Professional men? Truly may the Editor of the 'British Journal' say that the time and space occupied by his February article might have been better bestowed; he might perchance have written something sensible, instead of the blundering absurdity which he meanly, though impudently, has written in order to tell the College of Dentists "I didn't mean you."

I will now, Sir, say one word with regard to the *ci-devant* workmen who are so contemptuously spoken of by the writer of the article in question. To open up this question would be to extend this communication to a most unreasonable length; but I would observe that if many of those who *regard themselves* as the heads of the Profession, and of whom we read so much in the 'British Journal of Dental Science,' were unable to procure the assistance of the good mechanics (who afterwards become the *ci-devant* workmen), they would soon find a very small amount of fees. Further, if the *work* is so degrading to the dignity of these very high gentlemen, it would be far more dignified and more honourable in them to leave that part of the Profession to those who are not too idle to work, or too proud to own that they have fairly and entirely learned that business or profession by which they honestly live.

I must now conclude with the earnest hope that the Editor of the 'British Journal of Dental Science' will mend his ways and live in peace with his compeers, lest another gale take his canvas and lay him a complete wreck on the coast of slander.

I am, Sir, yours obediently,
A CI-DEVANT WORKMAN.

MISCELLANEOUS.

APPOINTMENT.—We have much pleasure in announcing that J. Cox Smith, Esq., M.C.D.E., of Maidstone, has been recently appointed Dentist to the Government Hospital of Fort Pitt, Chatham. The attention which Mr Smith has given to the subject of gun-shot wounds is known to the Profession through the publication of papers on the subject in the 'Quarterly Journal of Dental Science.' These papers are of a thoroughly practical nature, and prove the Author to be well calculated to fill the important office to which he has been appointed, with honour to himself and with benefit to those entrusted to his care. We believe this is the first Dental appointment to a Government Institution made in this country, and it is gratifying to find that it has been bestowed on a member of the College of Dentists, and one who has been so active in the cause of professional reform as Mr Smith.

ROYAL SOUTH HANTS INFIRMARY.—On Monday, February 3, a meeting of the Governors of the South Hants Infirmary was held at Southampton, for the purpose, amongst other things, of appointing a Dentist to the Institution. The meeting had been specially convened in consequence of the small attendance of governors at a previous meeting, when a quorum could not be formed. The other business having been disposed of, the Chairman, Captain Best, explained that no Dentist had as yet been appointed to the Infirmary, although the average number of patients for some years past had amounted to 375. The question was whether a Dentist should be appointed; and if so, what should be his qualifications. A very long discussion ensued as to whether the proposed officer should be called a Surgeon-Dentist, or simply a Dentist; eventually it was determined to adopt the latter term. It had been originally intended by the Committee to propose that the Dentist be required to hold the Dental Certificate of the College of Surgeons, but in consequence of the strong remonstrances of Mr Passenger and others, who urged the policy of requiring candidates for the appointment to be members of the College of Dentists as well as holding the College of Surgeons' Certificate, the proposal was modified so as to embrace any Dental Institution that may become possessed of a charter of incorporation, and the motion was accordingly put in the following form—viz., "that the Dentist should be required to possess a diploma from some legally-constituted body." Mr Passenger asked what they considered a legally-constituted body? The Chairman said, the laws of the country could be made to determine that. Mr Passenger considered that the motion would involve the Infirmary in a legal question. Captain Engledue said that some guarantee was necessary to the public that Dentists understood their business. Mr Passenger agreed in this view of the case, and he defied any one who had taken the trouble to become conversant with the question to say that the examination at the College of Dentists was not a thorough test of competency; he, therefore, proposed that the possession of a Dental diploma, either from the College of Surgeons, or the College of Dentists of England, be a sufficient qualification. In looking at the constitution of the latter, they would find connected with it men who were very eminent in the Profession, and who held a very high position; in fact, its diploma was preferred to that of the inferior rank in the Royal College of Surgeons. Captain Breton said the only reason the Committee preferred the rule as proposed, was because it would enable them hereafter to appoint some one holding the diploma of the College of Dentists, should they obtain a charter, which, he fancied, there was every probability of being the case. Mr Passenger: It may be some years before the College obtains its charter. Captain Breton thought not so long. The rule as proposed would not confine them to the College of Surgeons, and was expressly framed to admit members of the College of Dentists so soon as they obtained a charter. He had been informed by one who had undergone the examination before the College of

Dentists that it was very strict, and he held in his hand a list of the examiners, who were all eminent men. No doubt the examination was a good one, and the difficulty the Infirmary was in was that they must place themselves right with the public by acting in accordance with some strictly legal body, or many would start up and claim that their diplomas were as good as others. They did not want to be exclusive, but to admit as many as possible, and at the same time to guard themselves before the public so as to be enabled to say they had required a diploma from a legally-constituted body, which was the only one they could have, and there they must leave it. After some further discussion the proposal of the Committee was adopted. A vote of thanks to the Chairman terminated the proceedings.

LOWS *v.* KEKWICK—INJUNCTION.—In the Vice-Chancellor's Court, on the 13th ult., before Vice-Chancellor Sir R. T. Kindersley, the cause Lows *v.* Kekwick was heard, when the Vice-Chancellor made a decree to restrain the defendant from practising as a "Surgeon-Dentist" at Carlisle, Whitehaven, &c., according to the terms of the agreement, and that defendant should pay the costs. The following are the particulars connected with this case:—The plaintiff is a Surgeon-Dentist practising at Carlisle and other towns in the vicinity. The defendant was formerly his apprentice, and afterwards become his assistant; and when he was thus engaged, he entered into an agreement not to practise at Carlisle or within fifty miles thereof during the first five years after he left the plaintiff's service. It appeared, however, that the defendant upon leaving the plaintiff commenced practice as a Dentist at Carlisle. This the plaintiff discovered in the early part of last summer; and notwithstanding that a lawyer's letter was sent to the defendant upon the subject, he continued to practise, and the plaintiff then applied to the Vice-Chancellor for an injunction to restrain him from practising at Carlisle according to the terms of the agreement. On the part of the defendant it was contended that as Carlisle was his native place, and he had an aged mother to support, he always intended to practise there, and the agreement was modified by a memorandum in the fly-leaf of the document so as to take away the exception as to Carlisle. His Honour was of opinion that this contention could not be admitted in contravention of a plain agreement: giving the defendant the full benefit of the indorsement, that indorsement clearly meant that the defendant was not entitled to practise at Carlisle or at the towns specified in the memorandum. The evidence as to the intention of the parties upon entering into the agreement was somewhat conflicting. On the construction of the agreement, however, the plaintiff was entitled to the injunction.—The defendant then commenced practice as a "Mechanical Dentist," and an application was made to the Vice-Chancellor in August last by Mr Martindale on behalf of the plaintiff to commit the defendant for breach of the injunction, upon the evidence of one Samuel Butterworth, a quarryman of Penrith, who was paid 1*l.* per week by the plaintiff for travelling West Cumberland in search of information; but failing in this, he submitted to have several stumps extracted by the defendant, and new teeth with silver plates substituted; the defendant stating that he was not at liberty to practise in Carlisle, and therefore going to Stanwix, a small village about a mile off, and recommending a Mr Carrick to operate. Mr Glasse opposed the motion, and contended that the defendant had only operated upon Butterworth as a matter of charity, and had no intention of committing a breach; indeed, both on this and other occasions it had been attempted to induce him to practise, but he always declined. The Vice-Chancellor said that if the defendant had been in the habit of living in Carlisle, and holding himself out as practising by taking persons out of Carlisle to operate upon them, that would have been a breach of the injunction, and the plaintiff was at liberty to take measures for discovering the fact if he suspected that it existed. With regard to the evidence, the affidavit of a man like Butterworth, who lent his mouth to a painful operation for 1*l.* a week, was not so worthy of credit as that of the defendant. No doubt a trap had been set for him, which in another instance had failed, and the only case brought forward was that of Butterworth.

Under these circumstances, although operating out of Carlisle without charge would have been a breach, and although what the defendant did was wrong and unwise, this motion must be refused without costs. The defendant is now practising at Carlisle as a "Mechanical Dentist."

LORD OXYGEN.— . . . But our hero element is powerful to destroy, as well as to build up. Few, if any, elements have hardened themselves against him and have prospered. The strength of iron is as nothing with him, and weapons of steel he grinds to powder. Gold becomes as fine dust before him, and silver as the blackness of darkness. He calls for the aid of his servant, nitrogen, and the solid marble melts like snow. Helped by another servant, the flinty rock becomes grass and stubble before him. The leaves wither at his blighting touch, and nature is dissolved by his blasting energies. Let us think, for a moment, of the ruin he has wrought since creation's morn. The flowers, the trees, the birds, and the beasts of ancient days have all been swept away by the hand of this ruthless destroyer. He has swept over the earth, and nations have withered by the blast of his breath. Great Babylon is fallen—is fallen, and by his mighty hand. Where are the cities of the old world? He has burned them to ashes, or crumbled them to dust; and over their ruins he raises the shout of triumph, and rushes forward to new conquests. When the whole world had rebelled, he destroyed it by a flood—all its inhabitants, save one righteous family, which he carried in his bosom and wafted by the genial gales of his balmy breath to a place of safety. He has broken the ships of Tarshish with his east wind. He has overwhelmed fleets and navies in the mighty deep. Great is the ruin he has wrought, and still he is unsatiated. He forges the thunderbolts of war, and gives to them their destructive energy. He manufactures a cooling salt, which, in the hands of two of his servants, becomes a demon of destruction, hurling forth "firebrands, arrows, and death," and imitating the thunders of heaven. Nothing material escapes his destroying hand. He devours the widow's bread and wastes the fruits of the earth to create the demon alcohol, that the world may be filled with crime, and men may be changed to devils. He is the merciless executor of that sentence, "Dust thou art, and unto dust shalt thou return." And then just think of his petty annoyances. While he blows the smith's fire, he consumes his coals and wastes his iron. The surgeon rejoices in his shining blade, and the dentist delights in the lustre of his forceps; but he watches for their negligence and covers them with rust. He withers the leaves of the lady's arbour, and sours the milk in the dairymaid's pans. No annoyance is so petty that he will not stoop to it. He addles the egg of the patient bird, and moulds the food of the busy ant. He breathes into the pantry, and the bread becomes stale, the butter rancid, the meal musty, and the meat tainted. He rots the farmer's fruits, his farm houses and fences, and turns the housewife's jellies and jams to vinegar. In short, he is prying, petulant, and impertinent. Shall we reverence such an object as this? Shall we even respect it? Nay, shall we not ignore or despise the science that discovers it and reveals its attributes? But why should we not reverence it? Why not even worship it? While sages sacrifice to devils, and savages worship the storm-king, shall we fail to worship oxygen? What if it is the great destroyer of our race? Should we not try to propitiate that which will one day crumble us to dust? But let us turn from this, and think of his goodness. Why, he blesses us at every hour—gives us a new blessing with every breath. But how shall we specify his acts of kindness when we owe him our life, and are each moment dependent on him for its continuance! In the earliest moments of our helpless infancy he breathed into our nostrils the breath of life, and has breathed new life ever since. He allays our hunger and quenches our thirst, with food and drink adapted to our appetites and desires. He not only surrounds us with good things, but he is so jealous of our welfare that he rushes into and explores every avenue of our bodies, lest there may be something there to harm us. He ransacks our entire systems—veins, arteries, capillaries, and cavities—and comes out loaded with poison twenty times a minute. He makes every pore of the skin an outlet for the purification of our bodies. He kindles a fire to warm us when we are cold, and fans us with the cooling breeze when we are hot. He builds us houses like palaces to dwell in, for our comfort and protection. (From Introductory Lecture by George Watt, D.D.S.)—'Dental Register of the West.'

CHEMICAL AND PHYSIOLOGICAL STUDIES ON BONES.—The following are the results of a remarkable treatise on this subject presented to the Paris Faculty by Mr Milne-Edwards :—1. The substance of the bones results from the combination of *ostein* with the salts of lime. 2. Gelatin can form a particular chemical combination with the basic phosphate of lime. 3. It is this chemical compound which appears to form the bony tissue. 4. The carbonate of lime present appears for the greater part only as a product of the decomposition of the phosphate, brought on by the fluids of the organism. 5. The variations met with in the relative proportions of the phosphate and carbonate of lime depend, first, on the length of time during which they have undergone a nutritive decomposition ; and, secondly, on the equilibre maintained between the rapidity of this decomposition and the resorption of the compounds produced. 6. In the child the proportion of carbonate of lime is less considerable than in the adult and aged. 7. Bones which must be considered of recent formation, such as callus, &c., are less rich in carbonate of lime than those which have arrived at their perfect development. 8. The spongy tissue, which is undergoing the process of resorption, is richer in carbonate than the compact tissue. 9. In children the proportion of earthy matter is not so great as in the adult ; but this difference does not appear to depend upon a disparity in the nature of the osseous substance, and to keep itself *en rapport* with the proportion of that substance to that of the vessels. 10. Diet and hygiene can make a sensible impression in the composition of the bones. Dogs under a succulent and sweetened diet present less earthy matter, and especially less carbonate of lime, than those fed on meat and fat exclusively, while both take up various quantities of phosphate. 11. The arrest of the circulation of blood appears to have no influence upon the chemical composition of the bones. 12. The diversity existing in the composition of bones of individuals belonging to one and the same species is often greater than if compared with that of animals from a different zoological group. 13. Contrary to the assertions of M. Al. Friedleben, it must be assumed that chondrin and gelatin are two different substances.—'Amer. Drug. Circular,' December, 1860.

NOTICES TO READERS AND CORRESPONDENTS.

NOTICE.—This Journal will in future be published by Mr JOHN W. DAVIES, 54 Princes street, Leicester square, W., to whom all Communications intended for insertion, as well as Books for Review, &c., should be addressed to "The Editor," NOT LATER THAN THE 15TH OF THE CURRENT MONTH.

All communications intended for insertion in this Journal must be authenticated by the name and address of the writer, not necessarily for publication, but as a guarantee of good faith.

Contributors are requested to be so obliging as to write legibly, and on one side of the paper only.

BOOKS RECEIVED IN EXCHANGE.

The Dental Cosmos for February.
The Dental Register of the West for February.
The Southern Dental Examiner for January and February.
The London Medical Review for February.
The American Medical Times, Vol. 2.

THE

DENTAL REVIEW.

APRIL, 1861.

ORIGINAL COMMUNICATIONS.

ON THE APPLICATION OF HARDENED INDIA-RUBBER TO THE MANUFACTURE OF ARTIFICIAL TEETH.

A Paper read at the Monthly Meeting, held at the College of Dentists, February 5, 1861.

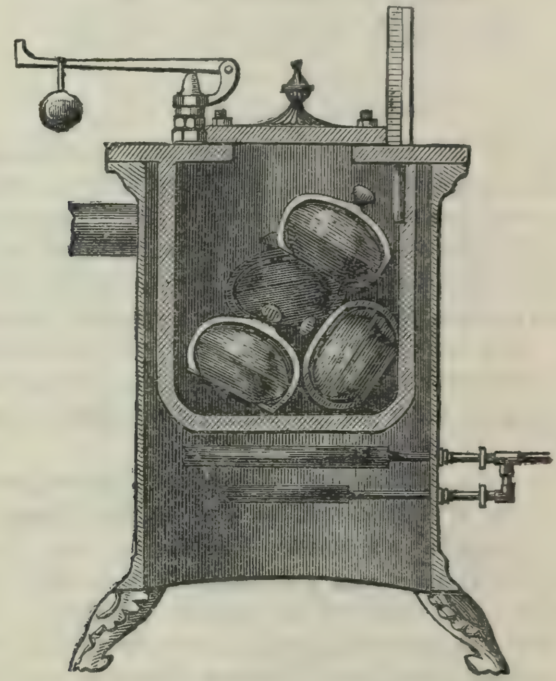
By Felix Weiss, M. C. D. E.

(Continued from page 107.)

The next point to be considered is the hardening of india-rubber by steam; a process which, for simplicity of action and certainty in execution, cannot be excelled. When this method was first introduced, much difficulty was experienced in making the apparatus steam-tight; but within the last few months, so great have been the improvements, that little or no escape of steam need be apprehended. It is true there is, and ever will be, some amount of danger in the employment of steam-heat; and upon this ground only the dry process is to be preferred, provided it can be made equally as simple and effective.

In Mr Putnam's Vulcaniser (the first introduced into this country), the steam is engendered in a separate vessel, communicating with a chamber in which the flasks are placed. The principle upon which all steam vulcanisers are constructed appears to be the same—viz., that of a Papin's Digester. Mr Childs' Superheated Steam Apparatus may, to a certain extent, be a modification of the original plan, but I cannot discover any difference in the results.

Time will not permit me to enter upon a discussion of the difference between superheated and saturated steam, and their respective merits as vulcanising agents. Much doubt exists in my mind, whether Mr Childs' method does produce a superheated atmosphere. The plan this gentleman advocates is not to introduce any free water into the chamber, as he considers that the water contained in the plaster models is sufficient; but where only one case is being vulcanised, a mass of moist plaster equal in size to another flask is introduced. Now, it must be borne in mind that the quantity of water contained in the plaster is equivalent to from 15 to 20 ounces; and 20 ounces of water will fill a chamber twice the size of that in present use, at a temperature of 315°, and still, to my mind, be saturated steam. Mr Childs, in his very admirable paper, read before the Odontological Society, on Superheated Steam, says: "The plaster has the power of holding within itself a large amount of water, which will not boil under a certain degree of heat, and *the pressure causes the extra water to go into the plaster.*" This appears to me very vague; but, however, this much we may admit —that an apparatus so arranged is infinitely *safer* than one containing a quantity of water ready at any moment to be converted into steam 1,700 times its volume. So many well-constructed steam vulcanisers have been introduced, that it would be invidious to single out one as being more perfect than another; but in common justice it must be allowed that those supplied by Messrs Ash, and also by Smale Brothers, are very perfect.



Mr Childs' Superheated Steam Apparatus.*

In vulcanising by steam, a great variety of opinions exist upon many important points. By some it is contended that the heat should be as gradually and as slowly raised as in the dry process. It has also been recommended to allow the heat to be one hour and three-quarters in mounting to 315°, and that the heat should remain one hour and three-quarters at that temperature. I have several times most carefully experimented as directed, and have also raised the heat to 315° in from fifteen to twenty minutes, and kept it at that temperature one hour and a half; yet I could not discover any difference in the pieces produced—one that has taken three hours in hardening, and another which had been vulcanised in one hour and three-quarters, appeared perfectly the same in colour and elasticity. I think a medium time is the best to follow—say from 30 to 40 minutes—in arriving at 315°, and one hour and a half at that heat. Much, however, will depend upon the rubber that is used: my experiments were made with Childs' G, and some few with Rowney's Thionised Orange. It certainly is very imprudent to run the heat up suddenly, if only on account of the danger that exists from heating cast iron so rapidly, and I cannot help thinking that about half an hour is as short a time as any one should desire. If we take simple rubber, which vulcanises black, and run the heat up suddenly, it will be found as spongy as if it had been done rapidly by the dry process; but I have not found the same result with any of the coloured rubbers.

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* Through the courtesy of Mr Ash, we are enabled to present the above engraving of this vulcaniser, now so generally employed.

The first thing to decide, is what is the chemical difference between vulcanised and unvulcanised rubber, and what changes take place in the process of hardening. At present we have but little information on the subject, but the view I take is simply this: the rubber, as prepared for our use, is merely a mechanical mixture, which, when baked at a certain temperature, becomes a chemical compound; that, while it is undergoing this change, hydrogen combines with sulphur, and sulphuretted hydrogen gas is generated. Now the reason, as it appears to me, why steam heat is so generally successful, is owing —first, to the density of the atmosphere of steam, which does not allow of any sudden variation of temperature, as in the dry process; and secondly, the sulphuretted hydrogen formed (which is the cause of all bubbles) is so rapidly absorbed by water, that the instant it is generated, it is taken up. I cannot satisfy myself that the pressure has everything to do with it, but only the density of the atmosphere, and the equalisation of the temperature. It has been remarked that a great deal will depend upon the size of the vulcanising chamber, and that pieces made in a small apparatus are more brittle than those done in a large one: this also favours my view. Again, in vulcanising, care should be taken that the flasks do not touch the metal of the chamber, or the piece may be partly baked, as by dry heat, owing to the conduction of the metal. These are important facts, which nothing but a comparison of the experience of those who have tried the various processes will decide: hence the advantage of bringing papers of this character forward; and it is our duty to excuse in some degree the paucity of new facts revealed by the essayist, for the sake of the valuable results which arise from the discussion of the many.

Let us now examine some of the rubbers which from time to time have been introduced; and, to facilitate their explanation, I have prepared a piece composed of eight different kinds, vulcanised at the same time. The first, Childs' G Rubber, so well known, is certainly a very fine preparation—good in colour, very elastic, and easily worked. The second is Rowney's Thionised Orange. This is, if anything, lighter in colour than Childs'; but it cannot be softened so readily, and is therefore very difficult to pack. When baked, it is light and very close in texture; but care should be taken not to fill the flasks too full, as it is only under a very heavy pressure it can be expelled. The third is Lemale's best quality. This is also a good rubber, not so light in colour, but easy to work. The fourth, Blackwood's, is very hard, very light in colour, but much heavier than those before mentioned, and, if baked too much, very brittle. It should never be vulcanised more than one hour and a quarter. The fifth is Lemale's second quality—a good colour but not so bright or so elastic as Childs'. The sixth is Payne's. The greatest drawback to this rubber is that it does not take a high polish, and seems as though some other material had been mixed with it, rendering it soft and chalky to work, and very liable to bend. The seventh is Ash's third quality—dark in colour, but in other respects a solid, elastic rubber. The eighth is simple rubber, which, as you know, vulcanises black. Now the only practical value this specimen possesses is owing to the fact of all the rubbers having been vulcanised together, and thus a good test is given as to their colours and general qualities in the process of hardening.

Many persons, who object to the principle of allowing mineral to meet mineral, at the same time complain of the rapidity with which vulcanite is worn down when used as a masticating surface, while objecting to the principle of allowing mineral to meet mineral. Indeed, it is pretty generally allowed that nothing is so comfortable in the mouth as mineral opposite to bone, for mastication. To remedy this wearing away in vulcanite, I have successfully incorporated with it silica, the silicate of magnesia (talc), and other substances; and it will be found that blocks so constructed are much harder, and, as far as I can at present judge, will wear much longer.

I have not yet mentioned Childs' Pink Rubber. This is used as an external covering, to represent the gum, and is certainly a valuable acquisition. It, however, has this great disadvantage—that it requires to be placed in spirits, and exposed to the sun or a bright light, to bring out the colour. In summer this may readily be done, but in winter it is a very tedious process. I exhibit a specimen which was in spirit night and day for nearly a fortnight in November, without any great change being discovered. I must observe that pieces done by dry heat come out a very different colour, and are much sooner affected by the light. When vulcanised by steam heat, the pink rubber comes out of a dark brown colour; but with the dry heat it is decidedly pink, and is affected by immersing it in spirit and exposing it to the light in a much shorter time.

I will now state some curious facts, showing how differently some kinds of rubber are affected by heat. While experimenting in metal moulds, I discovered, as I have before stated, that Childs' Rubber is the only one to be depended upon. I have here two specimens made expressly as illustrations: in the first it will be found that all the rubbers are full of bubbles except Childs', Rowney's, and Blackwood's; and in the second specimen, none but Childs' has stood the heat. It is a remarkable fact, that Child's G Rubber is less liable to bubbles or sponginess than any of the many compounds I have yet experimented upon, and in metal it was found to be the only one that could be successfully employed.

There is also a specimen of the same rubbers done in plaster by the dry process. These will be found to be nearly the same in colour and toughness as when steamed.

I must now speak of the union of vulcanite. It has been doubted by many, whether in this union we have anything but a close mechanical join. I have for a long time felt fully satisfied that vulcanite can by heat be brought into that state, not as when originally modelled, but sufficiently soft to unite to new rubber. I have tried by fitting two pieces carefully together, and then subjecting them to heat, to produce a union, but have never succeeded. I have fully proved that vulcanite, upon being a second time subjected to heat, only becomes partially softened: when, however, a little new rubber is added, the union is a chemical one,—not a mere mechanical join, but a chemical solder.

We all know the remarkable affinity that vulcanite has for metals, and that they, although exceedingly thin, may be perfectly united to it. Thus, we may line our work with gold or other metals without (as long as they are in the state of foil) any injury to the fit, and the metal lining assists in keeping the pieces clean.

It will now be necessary to make a few remarks upon the various methods of constructing our model pieces; and I consider this a very important part of our subject, as much of the success of our finished pieces will depend upon the construction of our model. Wax has been generally employed for the construction of our model pieces; and this can hardly be improved upon for complete lowers, but with uppers many suggested improvements deserve attention, one of which I will describe:—Lead is rolled out to about No. 13 in thickness, and with this a plate is made as you would with pattern lead. This can be fitted to the model by pressure of the finger; and if not thick enough, another covering may be added; and the teeth are mounted in wax in the usual way. This plan has many advantages. In the first place, the pieces come out of equal thickness, and are remarkably smooth. They may be readily tried in the mouth, and the bite perfectly adjusted without fear of bending.

Another very ingenious method of mounting small pieces has been suggested by one of our members; namely, to use the vulcanite itself, doing away entirely with a model piece. This plan is a very simple one. The rubber being first warmed, is pressed upon the model, and made to take a perfect fit, and the teeth fitted in. One great advantage possessed is, if you desire to fix metal bands they can be placed in their proper position. I have seen several very perfect pieces made in this manner; and, indeed, I think, with practice, it might be improved upon, and larger sets mounted without the trouble of previous modelling. I may remark, that these pieces vulcanise perfectly solid, and are to a line what you desire them to be, while the saving of time is very great.

Lower pieces may be constructed in a variety of ways. If it is a complete arrangement, nothing can be better than all vulcanite and mineral, excepting at the back; and the molars may be capped with the hard vulcanite before mentioned. When teeth are standing in the front, and the piece is what has been termed a bridge, a metal wire (hard platina does very well) should be passed along the back of the teeth, entirely cased in vulcanite; or a thin gold plate can be constructed with vulcanite to form the ends. All these plans are highly successful, and are so generally known that I shall not detain you by dwelling upon them.

We cannot too highly extol the use of vulcanite for regulating cases: the perfectness of its fit, the admirable manner in which it can be made to keep its place in the mouth, the little injury that it can possibly do to the teeth—its smoothness, lightness, and strength, give it the precedence over bone, gold, and every other material.

Before concluding, I must call your attention to the various flasks now in use. We have, first, the common pattern or three-part flask, which may be employed in every case. In using this flask, however, it is necessary to take the greatest care that no more rubber is packed in than is required: channels should be freely cut in the plaster, to permit the overflow of all superfluous vulcanite, or the piece will be higher than intended. We have next a modification of this pattern doing away with the necessity for a cramp, an exceedingly useful arrangement. We have then the four-part flask, originally proposed by Messrs Bell and Turner. By this contrivance the teeth are precisely the height of the model, all the superfluous rubber coming into the palate. And fourthly, we have a modification of this arrangement proposed by Mr Bennett, where the plaster is allowed to run on to the interior of the model, so that by the introduction of a disk any degree of thickness can be given to the piece, and that thickness is perfectly equal throughout.

Messrs Bell and Turner's flask is constructed to avoid the great fault complained of in others—viz., that of leaving a stratum of vulcanite between the two halves of the mould, and thus altering the articulation of the piece; and by Mr Bennett's improvement the ridges upon the palate can also be imparted to the vulcanite piece. It is thought by some that these ridges improve the general appearance of the piece when finished, and enable the wearer to articulate with greater distinctness.

In order to realise these advantages, the following directions have been given:—First cut the plaster model as shallow as possible, so that, when placed in the bottom of the flask with the modelled piece upon it, and the second part of the flask is laid on, there shall be a space of nearly half an inch between the top of it and the crowns of the teeth. Having done this, take the bottom or first section of the flask, mix some plaster, pour in a little, and set the model; then trim off the plaster to the level of the metal edge of the flask, put on the model piece, and apply the "non-adhesive liquid" (or grease) to the surface of the plaster, but not to the teeth or wax; then put on the second section of the flask, and fix in the three pins, mix fresh plaster, and begin by putting in a little at a time, filling up the space between the flask and the teeth until the crowns and cutting edges of the teeth are quite covered level with the metal edge, leaving the whole of the centre leading to the palate quite open: this opening must be sloped a little outwardly to insure the safe delivery of the next portion of the mould called the plug.

When the outer surface of the vulcanite piece is intended to represent the ridges of the palate, as proposed by Mr Bennett, it is necessary at this stage to cut away all that portion of the wax which covers the palate on the model, close to the backs of the teeth, thereby leaving the plaster surface exposed. Having done this, apply the non-adhesive liquid (or grease) to the surface, upon which the plaster is to be poured, including the palate; put on the third section of the flask, and with additional well-mixed plaster fill it up to the top; then put on the lid, and the mould is complete.* When the plaster is set, place the flask in boiling water to soften the wax, to prevent dragging the teeth from their places while removing it from the mould.

In separating the mould, first remove the plug or last-poured section, then take out the three pins, and carefully part the remaining sections, remove the bulk of the wax, and any portion still adhering to the teeth or mould can be instantly removed by means of a stream of boiling water; then trim off all sharp edges, as well as a ridge which will be found upon the plug. Trenches can be cut for the escape of surplus rubber in the back of this section of the mould.

In packing, having softened the rubber, place the second and third sections of the flask together, and pack with small pieces about the pins of the teeth; then separate these, and place the first and second sections together, put in the three pins firmly, and finish the packing down the opening of the mould. A thin metal plate (A), to prevent the mould coming close together, should then be inserted between the packed mould and the plug. Then place the flask in the ring, and, after gradually warming it in an oven to soften the rubber, screw it up quite close.

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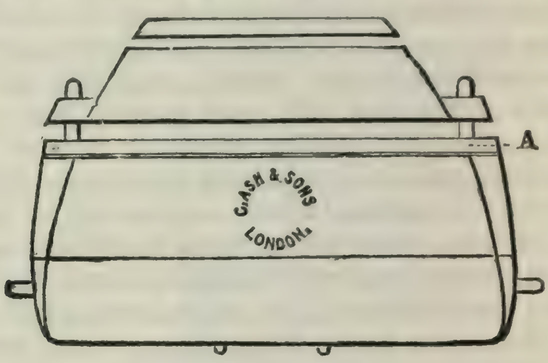
* When a smooth palate for the outer surface is preferred, then the wax covering the palate must not be cut away: in such a case, as well as in all lower pieces, the metal plate will not be required.



When the piece is vulcanised, it will be found to be the exact fac-simile of the original model, both in the height and position of the teeth, having the outer surface of the palate corresponding with that of the model, and of the thickness of the metal plate referred to above.

It is my duty to call your attention to the beautiful specimens of mineral teeth, applicable to the vulcanite process, now being manufactured. Messrs Ash and Sons have a large variety in every form, size, and colour, free from porosity, and, therefore, capable of being ground and polished. Lemale and Company have also introduced mineral teeth made from natural models, with a beauty of finish and resemblance to nature truly surprising. They have them also mounted in sets with mineral gum, and equal, in my judgment, to anything of the kind that has yet been introduced. The vulcanite teeth manufactured by Smale, Taylor, and others, and those introduced by Mr Pratt, are very beautiful, and deserving of more than a passing notice.

I must not forget to allude to some of the imperfections of vulcanite, noticed, I have little doubt, by many of you. One is the shrinking of the rubber around the teeth. This has generally been considered the result of over-steaming or baking, and I am of the same opinion; but the peculiarity is, that sometimes the shrinking will be noticed on the one side, and not on the other. This, it appears to me, is caused by the flask touching the side of the metal chamber, and, as I have before alluded to, causing the one side to be done before the other. A remedy has been suggested to let off the steam the moment the cases are completed, and to plunge them in water: others, again, recommend that they be allowed to cool gradually. I have found the same amount of shrinking when either the one or the other precaution had been taken; but if the teeth have a rough surface, such is not the case. Again, I have noticed a considerable warping in pieces that have been laid aside for some time. It is true, they may be restored to their proper shape by tying them on to a metal model, putting them in boiling water, and allowing them to cool.

It is now my duty to endeavour to sum up as impartially as I possibly can the merits and demerits of vulcanite. I have endeavoured to convey a general idea of its construction, and may be accused of dwelling with unnecessary minuteness upon that process most generally condemned. I mean the dry process. But I have simply done so as it appeared to be less understood, and I shall ever set my face against any condemnation unless it is founded upon a long and thoroughly-tested experience. I have given a decided preference to the hardening of india-rubber by steam; but I do not consider it at all unlikely that a process will in time be discovered doing away with the drying of models, and making the dry method as efficacious as steam, without the danger which attends that method.

It would be the height of folly to contend that the introduction of vulcanite is not a remarkable era in the mechanical department of the Profession, and that its discovery must not eventually supersede the use of bone; but while admitting its value as an indestructible and exceedingly light substitute for that material, I cannot allow that it is applicable in every case. When I hear that in the practice of some gentlemen it is used in ninety-nine cases out of the hundred, I must be permitted to state that, in my opinion, they either do their patients a grievous wrong, or that the cases coming under their care are of a very different character from those met with in an ordinary practice. I cannot go so far as some, and contend that it should never be used in the upper jaw at all. I have visited many professional gentlemen, and have seen a great variety of cases, but my opinion remains unchanged. I do not give that opinion as possessing any weight; I can merely say, I have studied the character and capabilities of vulcanite to the best of my ability. It remains for the Profession at large to decide in what cases vulcanite should or should not be employed. In every case that can be successfully treated with bone, vulcanite should unquestionably be used; but in partial uppers, in shallow uppers, and in cases of two, three, or four teeth, saving in a few solitary exceptions, I should never advocate its use. I think I am called upon to make these remarks; for remember, gentlemen, that no material should command our attention simply because it is cheap. The time-honoured gold plate in some cases can never be superseded, and the indiscriminate and exclusive use of any material can meet with but few advocates among the well-informed Members of our Profession.

That vulcanite has been, and, I fear, is used indiscriminately, we have the testimony of those who manufacture the mineral teeth; and if I am rightly informed, the demand for teeth suited to this process is more than treble that of other kinds. Do not let me be misunderstood: I consider vulcanite a valuable addition to our work-room; I would employ it, and employ it largely, but not, as suggested by some, in every case. And now, gentlemen, I shall conclude, and while thanking you for your kind attention, must admit that I have but hastily glanced at my subject; a great deal more I had intended bringing forward, but found it impossible to compress it into the paper of one evening. I fear that I have hardly done that justice to the subject it merited, and must, in justification, state that I had no idea of delivering such a paper when requested to do so. If, however, my attempt should be the means of bringing out the experience of others, I have done all that these Meetings were intended to effect, and shall feel not only sufficiently rewarded myself, but am convinced our object here this evening will have been fully attained.

ON THE SCOPE, TENDENCY, AND EDUCATIONAL VALUE OF THE NATURAL HISTORY SCIENCES.

By T. Spencer Cobbold, M.D., F.L.S.,

Lecturer on Comparative Anatomy, Metropolitan School of Dental Science.

(Delivered at the Royal Institution of Great Britain, on Friday Evening, April 20th, 1860. Sir Henry Holland, Bart., M.D., LL.D., D.C.L., F.R.S., &c., Physician to the Queen, in the Chair.)

(Continued from page 115.)

Bearing in mind the practical considerations I have in view, permit me in the next place to direct your attention more particularly to the educational value of the Natural History Sciences.

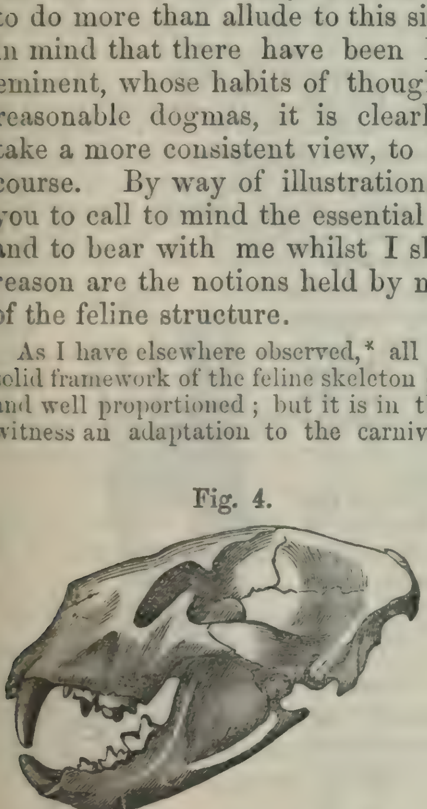
The study of Geology, Zoology, and Botany, collectively or in part, may be rendered more or less subservient in every walk of life; and even to those who pursue these sciences as a source of intellectual gratification they offer peculiar advantages. All of them are fit and easily-accessible sciences for training the mental powers of observation, and, at the same time, if allowed to exercise their full and legitimate sway, they are eminently calculated to advance our social interests. Let me put this more precisely.

In the daily routine of life, whatever direction our duties may take, or whatever character they may assume, it is admitted by all that nothing is more essential than a well-regulated mind, able to observe, to store up, and to form a correct estimate of the value of facts; and the possession of an intellect of this discerning habit is of immense importance, not only in the acquisition of knowledge, but in the formation of correct opinions. It is granted, indeed, that in so far as the requirements of a man of narrow sympathies are concerned, a fair amount of the so-called common-sense principle may be all that is absolutely necessary for his material advancement; yet, if we desire the higher intellectual developments of a well-regulated mind—such as the faculty of a retentive memory, a power of detecting the most subtile distinctions between one thing and another, and a thorough comprehension of our social position—we must look to the culture of our mental processes. The absence of a retentive memory is by no means indicative of original stupidity, want of application, or lack of talent; yet those who would become possessors of this valuable product of mental discipline, can only do so by pursuing some subject, the study of which involves a methodical and continuous process of abstract reasoning. Confusion and obliviousness are commonly the result of indiscriminate observation; and the highest degree of cerebral activity will fail to recall facts once familiarly known, unless the storehouse of the mind has been filled in a gradual and tentative manner.

One of the most constant results accruing from the diffusion of the Natural History Sciences is seen in the tendency of such pursuits to overthrow popular prejudices and preconceived opinions. In face of an assembly like the present, it may seem unnecessary to do more than allude to this simple fact; yet, when it is borne in mind that there have been Naturalists, otherwise deservedly eminent, whose habits of thought have led them to entertain unreasonable dogmas, it is clearly the duty of those who wish to take a more consistent view, to point out the impolicy of such a course. By way of illustration, therefore, I respectfully invite you to call to mind the essential characters of a typical Carnivore, and to bear with me whilst I show how entirely at variance with reason are the notions held by many respecting the final intention of the feline structure.

As I have elsewhere observed,* all the osseous elements entering into the solid framework of the feline skeleton (in its highest development) are massive and well proportioned; but it is in the conformation of the skull that we witness an adaptation to the carnivorous habits of the species most conspicuously. In the accompanying representation of the cranium of a tiger (fig. 4), the remarkable shortening of the fascial bones, associated with the powerful grasping teeth, and a surprising transversal breadth of the skull below the orbital and temporal fossæ, are especially significant. The teeth are thirty in number, and of these we find only four true and ten spurious molars, the ultimate grinder on either side of the upper series being tuberculated. This tooth, however, is particularly small, and widened laterally; but, with this exception, all the molars are much compressed

Fig. 4.



Profile View of the Skull of a Tiger.

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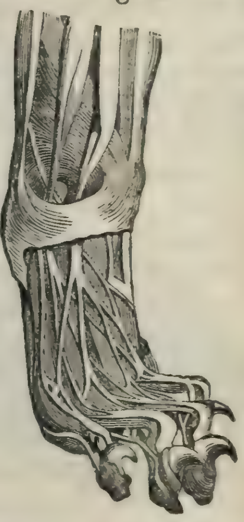
* In my introductory remarks on the general structure of the Felidæ, in the 'Museum of Natural History,' vol. i., div. 1, Mammalia, p. 109. The *viva voce* description was an abridgment of this intercalation.—T. S. C.

from side to side. The crowns are sharp and pointed, the two series, during the action of the jaws, closing in upon each other like the blades of a pair of scissors. Their function is therefore essentially cutting, while that of the huge dagger-like canines, assisted by the incisors, consists in tearing and lacerating—the due performance and integrity of these actions being secured by the strong temporal and nuchal muscle acting upon the occiput and the lower jaw ; and further, to prevent any lateral motion, such as we find in those animals which grind and triturate their food, the condyles or articulating facets of the last-named bone are firmly lodged in the corresponding transversely-elongated glenoid sockets.

Co-ordinating with this prehensile and offensive armature of the jaws, we also find the structural modifications of the feet eminently suggestive. Those of the anterior limbs are pentadactylous, while the posterior feet are tetradactylous ; but the peculiarities which principally distinguish them arise out of the beautiful provision made for the preservation of their formidable retractile claws. The mechanical contrivances here displayed are perfect. Not only are the actions of flexion, extension, pronation, and supination amply provided for—by the peculiar manner in which the bones of the fore-limb are articulated together—but the muscles of this member are so prodigiously developed, that, as is well known, a single blow from the sledge-hammer-like paw of the lion or tiger will fracture the skull of a man, and deal out death to almost any animal that may happen to come within its ponderous swing. In addition to this, we find the claws ordinarily maintained in a state of retraction : this concealed position is accomplished by the agency of three elastic ligaments or bands, which being severally placed above and on either side of the digit, serve to connect the ultimate phalanx to the penultimate segment of the same toe. All injury to the claw is hereby prevented—a circumstance which, associated with the presence of resilient sole-pads of thickened submucous tissue placed under the ball of the toe, also serves to secure the characteristically graceful and noiseless tread of the feline animal. Antagonistic to the elastic binding cords above mentioned, the tendon of a large muscle, called the flexor profundus perforans, is inserted below into the base of the ultimate claw-supporting phalanx. When, therefore, it becomes necessary to display or employ these fearful instruments of destruction, a violent contraction of the muscle in question—which, of course, involves a drawing back of the tendon, and a consequent thrusting forward of the claw—is the principal agency by which this change is effected. There are likewise other small extensor muscles inserted at the upper end of the digit (fig. 5), serving to steady the movement and regulate the degree of protrusion, according to the will of the animal.

It may be further remarked that, although the above constitnte the more prominent features in the various structural changes adapted to the wants and habits of the Feline Mammalia, there are others also worthy of being mentioned ; such, for example, as the strong, horny, recurved papillæ of the tongue, formed for rasping the soft flesh from the bones of their slaughtered victims—the comparatively small salivary glands, showing how little mastication is required—the uninterrupted chain of osseous elements extending from the larynx to the head—the flexibility of the vertebral column—the small cæcum—the shortness of the alimentary canal—and, more particularly, the simple cylindrical stomach, which explains that the food is more readily reduced to the condition required for nutriment than obtains in the Herbivora, properly so called.

Fig. 5.



Dissection of a Lion's Foot, displaying the tendons and ligaments.

Contemplating these arrangements, we unequivocally assert that the Carnivore is designed to occupy that particular field in the economy of creation for which its powers are so befittingly adapted; and one would scarcely suppose the legitimacy of this conclusion could be denied. Nevertheless it is. Some have, even recently, undertaken to teach that the organs in question—in which we are wont to recognise evidences of harmony and design—have been diverted from their proper development. They aver that the claws, teeth, and stomach—thus admirably constructed for the seizure, tearing, and digestion of the flesh of other species—so far from exhibiting evidences of benevolence, display rather traces of a different intention; all these organs severally contributing to render the creature ferocious, cruel, and destructive—habits which, in these anti-zoologists' views, the animal ought not to have! Such is an illustration of the melancholy inferences to which unscientific reasonings inevitably lead—a sad mimicry of mediæval times.

For the successful cultivation of the Natural History Sciences, it is above all things necessary that our minds be imbued with a love of truth, in whatever aspect it may present itself. If we perceive that the integrity of organised existences on this planet can only be maintained by the reciprocal action of antagonistic forces, and that the balance of this reciprocity involves and guarantees the welfare of every living entity *having*—in actual possession of—a residence on the habitable globe; if, I repeat, it is clearly evident that any departure from this divinely-appointed law would, on the one hand, only bring about a redundancy, or, on the other, a deterioration; what, I ask, is to be gained by criticising this universal plan—this wise method of government, fixed on principles of justice, equity, and compensation? In the nicely-adjusted balance of probabilities, I recognise abundant good to all living beings, whose immediate wants are thus provided for, and I am content to acknowledge the fitness of the provision which thus regulates the destiny of every species!

The vantage-ground thus imperceptibly acquired induces me, finally, to offer a more direct illustration of the *moral* tendency of the Natural History Sciences. Here, however, I may be brief, as the subject has been treated by other hands.*

It is a true observation, that things familiarly known and understood often fail to leave their due impression on the mind; yet this evanescence is in a great measure counterbalanced in those who court philosophy in common things. Some of the more striking phenomena, however, maintain their teleologic power, in spite of the deteriorating influences of familiarity, or the falsely so-regarded materialistic tendencies of developmental hypotheses. What theories, we ask, shall nullify our independent conceptions of the final cause demonstrable in an examination of the complicated mechanism of the Camel's stomach, associated as it is with other co-ordinating structures almost equally significant? Our reasonings are not fettered by the consideration that the stomachal compartments and their numerous water-cells (fig. 6) remain, after all, mere diverticula of the œsophagus. In our view, on the contrary, these morphological variations do but serve to indicate a uniformity of plan, harmoniously blended with the development of other tissues, objects, and circumstances by which the creature is surrounded; and, therefore, whilst we admit, with Lavater, that every organ is "an assemblage of incomprehensible effects," we are at the same time led to recognise the fact, that each bears a strict relation to all exterior organic and inorganic phenomena manifested throughout time and space. Whatever be the history of differentiating specialisations, no matter whether we trace them in connection with the formation of groups, species, varieties, or even particular organs, I am prepared to maintain that such phenomena, if rightly viewed, are calculated to strengthen rather than to lessen our appreciation of the doctrine of final causes!

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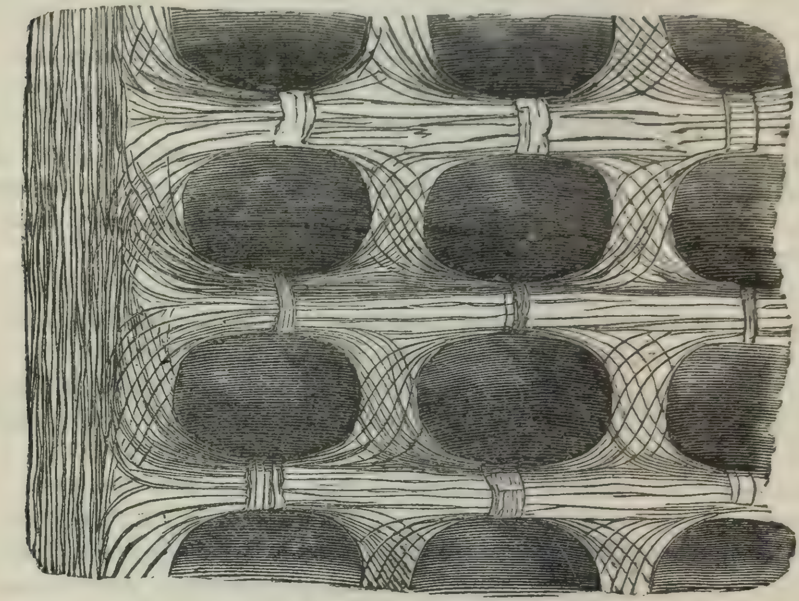
* See Professor Huxley's discourse 'On Natural History, as Knowledge, Discipline, and Power,' delivered at the Royal Institution, Friday evening, February 15th, 1856.

Fig. 6.



Portion of the First Stomach or Paunch of the Dromedary, showing the water-cells.

In regard to the important relations which the Natural History Sciences bear to the resources of art and commerce, these cannot now be entered upon; and this is the less necessary, as one department of the subject, at least, has recently received able exposition within these walls.*

Brevity in the enunciation of my purpose may have failed to convey to you a due estimate of the scope and tendency of the Natural History Sciences; nevertheless, if the appetite has been augmented, the mind imbued, the desire enlarged, and the will provoked in the direction my arguments have taken, sufficient has, I think, been said to prove the necessity for a wider diffusion of the Natural History Sciences on purely educational and moral grounds. In order, however, that the student may derive durable profit from these studies, *it is absolutely necessary that the tutoral method of communicating knowledge should be combined with the delivery of public lectures.* I believe our Collegiate establishments, so far as the above sciences go, all fail in this particular. When private instruction by demonstration is superadded to public teaching, it is surprising what a relish and facility in acquiring information is thus imparted to the learner. The masses of uncorrelated objects by which the student of organic nature is at first surrounded soon marshal themselves before him like the serried ranks of a well-disciplined host, whilst day by day fresh levies crowd upon the circle of the mind's horizon; yet, notwithstanding this accession of numbers, and the varied uniforms they severally present, it is by-and-by perceived that harmoniety plan pervades their movements, and the meanest unit has its part to play, not only in the *struggle*, but also in the *enjoyment* of its existence.

Of course, in all this teaching, it is assumed that the tutor shall be something more than a mere book-worm—one, in short, who, by practical work in the field, and by careful observation, assisted by all available artificial aids—coupled with a more or less extended acquaintance with the labours of other workers—has it in his power to unveil the beauties of creation as they successively declare themselves to an unprejudiced inquirer.

Under these advantages the study of the Natural History Sciences is productive of the happiest results; the impressions left upon the mind being analogous to those which the ear receives from a well-sustained series of harmonies. Were these experiences, however, shared only by those who are occupied with the warm and cheerful precincts of vitality, the Biologist in any of his callings might afford to despise the researches of the Geologist; but, strange as it may appear to the uninitiated, a similar effect follows the contemplation of the frigid outlines of inert matter.

In a social point of view, I ask, then, finally:

Is it not a privilege to commune with those whose minds are

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* In a course of lectures 'On the Relations of the Animal Kingdom to Man,' by Dr Lankester, F.R.S.

imbued with a love of Nature, as she attires herself in the ever-varying attitudes of organised existence? Is is not delightful to come in contact with those whose sympathies extend to objects placed beyond the narrow confines of their daily observation? Is it not congenial to welcome truth in whatever phase she is discoverable in the physico-chemico-vital records of a past and passing world? And is it not profitable, withal, to cherish glimpses of the infinite as we try to draw aside some superficial folds of that dark and many-plaited "veil which separates the seen from the unseen?"

To these interrogatories our learned Institutions will surely answer affirmatively; and I do not suppose the highest of them will object to the following definition of its final aim, as expressed in the language of Vicesimus Knox:—"Mutual improvement, and the investigation of truth; the development of the seeds of genius, and the detection of falsehood; the emancipation of the mind from the fetters of prejudice, and the cultivation of true friendship by social and liberal intercourse!"

THE DENTAL REVIEW.

LONDON, APRIL, 1861.

As the representatives of the only free and independent Dental press of this kingdom, we ought not to be behind our Medical compeers in heartily congratulating the liberal and earnest members of our body on two notable triumphs which they have recently achieved. It has often been thrown out as a sneer and a by-word against the Institution which is the centre of an independent Dental policy in England (we mean, of course, the College of Dentists), that, from its being as yet unchartered, it could rank as nothing in the social scale; that its Certificate, though gained by honourable competition, could prove of no avail, and that the failure of the College would turn on the circumstance that the public bodies of this kingdom, having important appointments in their hands for disposal, would cast the College aside as something unrecognisable, however good, because it was not gifted with a charter, conferring specific privileges. We confess that, some long time past, we had ourselves an anxious doubt whether such a misfortune as that we have indicated might not befall us ; for Englishmen, however liberal in heart, are not unfrequently given to stand hard by ceremonials, even in opposition to their inclinations. In this instance, however, we are glad to see that our gloomy forebodings are as perfectly removed as the pungent exultations of our truth-loving, easy-virtued, and eminently scholastic opponents are signally lowered. We took hope when, in response to an appeal to the Medical Profession, the unprecedented result of 3,000 signatures to our cause came in to us so willingly and heartily. We knew, on the best authority, that even in examples where eminent bodies belonging to the Medical Profession itself had canvassed for a "yes or no" expression of opinion, such a general response had never been approached ; that in the matter of a new Medical bill, by which the whole Profession itself might be modified, no such an expression had ever been elicited : and seeing all this, we were convinced that such an affirmative as 3,000 men could give would have an effect lasting for many years;—an effect sufficient to bridge over any reasonable period during which our Institution might be allowed to struggle, until it gained its final and proper recognition.

Again, we took hope when we saw by us and with us the Medical press, and read in that press the certain fact that all the boastings, the fallacies, the intrigues, and the influences of those who tried to put us irrevocably down, were seen through as transparently as air and treated as the idle wind ; and lastly, in the way of indirect assurance, we felt not a little sustained by the knowledge that our own learned and industrious brethren on the other side of the Atlantic were cheering us with their kind words of sympathy and unequivocal approval. For, as the poet says,

"Though 'tis not in his power to raise his hand,
"And with his hand bring freedom to our hearts,
"Or from his purse throw offerings to our needs,
"Who gives us sympathy and cheering smiles
"Does the next act in friendship and in aid."

With all these good omens to cheer us, then, we waited patiently for results, and results have now come which have fully satisfied us: precedents have been given and recognitions made to which we refer, as we may well, without boasting, but with sincere gratification. In the first place, the Government itself had an appointment for a Dentist. It has filled up that appointment by the election to the trust of Mr Cox Smith of Chatham, now Dentist to the Fort Pitt Establishment. In making this selection our authorities have done at once a wise and a liberal act: they have elected a first-class practitioner, and, therefore, they are wise; they have elected a stanch defender of the independent section of Dentists, and, therefore, they are liberal as well as wise. The precedent is worth a charter: it is a tacit recognition of right by the highest authorities in the realm.

Following in the same liberal track, the Governors of the Essex and Colchester Hospital have elected Mr Robert Tweed as Dentist to their Institution. There was a discussion amongst these gentlemen on the points which have created so much excitement at Southampton. The discussion ended in another liberal triumph; for Mr Tweed, a Member of the College of Dentists, was unanimously elected, and is now the Dentist of this County Hospital. The Governors will find that they have made a choice which will not be regretted.

With these facts before us, we congratulate our brethren on the success—the practical success—of their principles. Good principles, the very best, often lie long dormant: here they are quickly taking root, and bearing fruit in their season.

Preparing himself for occasional failures (since unswerving success is not granted to any one), let, then, every independent Dentist take up these recognitions cheerfully and manfully. Let nothing disturb him or shake him in his aspirations:—let none shrink: for to stand true to a sound principle is to win as surely, as when in a battle where direct physical force is at work, the conquering army is always that army which never moves save in one direction—*onwards*.

> "Say what you have to say boldy; never mind what people say in answer to it; never mind your misstatements being exposed, or your fallacies being unravelled. When your adversary has done, say it again yet more boldly than you did at first. This logic of reiteration, when practised vigorously, habitually, and impudently, is almost as irresistible as the logic of facts in the mouth of an emperor commanding half a million of bayonets."

Our inveterate enemies in New Burlington street have placed the foregoing quotation at the head of their leader for the last month. It would be impossible better to describe the line of conduct they pursue, or to obtain a clearer insight into the principles which guide them as journalists; principles which would have been received with acclamation in the times of Machiavelli, but which, as our great Essayist has observed, "mark a man of our age and country as utterly worthless and abandoned."

Two months since, an article appeared in the 'British Journal of Dental Science,' reflecting in such a manner upon the Members and Council of the College of Dentists, that the Executive of the College considered it to be their duty to call upon the Editor for an explanation of his meaning. This inquiry resulted in a correspondence with the Secretary of the College, which we have published elsewhere, and which the Editor of the 'British Journal' has considered it a matter of discretion to insert in his last number. We speak of it as a matter of discretion, for we cannot attribute any act of the Editor either to his sense of justice or of courtesy. It was hardly to be expected that the insertion of the correspondence would not be accompanied with another attack upon the College; and the readers of our contemporary are therefore treated, for the fiftieth time, to a mingled lamentation over the Protest, and to a series of indefinite charges against the Council of the College of Dentists.

First, it is said that "they (the Council) elect as Members, and arm with their Diploma, advertising Dentists, and encourage them to take part in the College meetings." The answer to this is, Let the Editor name the parties · and unless he does so, he must be considered as making assertions which are without foundation, and which he knows he is unable to prove.

Again, it is said that "a greater number than three (advertisers) have been elected by the College of Dentists, even at the last two meetings." The simple answer to this is, that no three Members have been elected at the last meetings of the Council.

A misinterpretation, by one of the Governors of the Southampton Infirmary, of a letter written by the Secretary of the College of Dentists, is eagerly seized upon for the purpose of charging the latter gentleman with having made a wilful misstatement. What the Secretary to the College of Dentists really stated was, that as regards gentlemen who had been in practice, the College of Surgeons did not carry out the curriculum which it has laid down for the Dental Certificate, and that the examination itself was greatly modified.

We are perfectly prepared to endorse this statement, and we repeat that, in reality, in many cases the form only of an examination has been gone through. It is absurd for Mr Bell, or any other Member of the Examining Board of the College of Surgeons, to endeavour to persuade those who are well acquainted with the knowledge and standing of certain gentlemen holding the Dental Certificate of the College of Surgeons, that they have, or ever could have, by any possible means, stood the test of anything bearing more than the semblance of an examination.

For our own parts, we are tired of thus continually fighting with shadows. We can occupy our Journal with matter of more importance to our readers than by replying to the vague assertions of our opponents. Let these charges be presented in a tangible form, and we will deal with them; but until this is done, we shall trouble ourselves no further concerning the monthly paroxysms of our contemporary.

SELECTED ARTICLES.

DENTITION AND ITS DERANGEMENTS.

A Course of Lectures delivered at the New York Medical College and Charity Hospital (Session 1860-61).

By A. Jacobi, M.D., Prof. of Infantile Pathology and Therapeutics.

(From the 'American Medical Times.')

(Continued from page 123.)

Lecture II.

Although the earliest development of teeth is of considerable importance, I shall not dwell upon it longer than is necessary to a simple elucidation of the process. A knowledge of the origin of the teeth and their first development is, however, required in order to understand the manner of their final protrusion through the gums. The rudiments of the teeth are observed as early as the sixth week of fœtal life, when the embryo weighs but fifteen grains, and is little more than half an inch in length. A deep groove first appears lined with mucous membrane, within the external alveolar margin of the upper maxillary bone. It has been named, by Goodsir, the primitive dental groove. According to the concise description of the anatomical researches on the formation of teeth given by Harrison, the germ of the anterior deciduous molar tooth is formed first, appearing as a small papilla on the floor of the primitive dental groove; next the germs of the canine teeth are formed in the same manner; and about the tenth week of fœtal life, those of the incisors; and, lastly, those of the posterior deciduous molar teeth. This *papillary* stage is followed by the *follicular* and *saccular*, from the fourth or fifth months of fœtal life upwards. Delicate processes extend from the sides of the primitive dental grooves over each papilla, and by meeting before and behind it, inclose it in an open follicle. About this time the papillæ begin to change their form, and to assume that of the future teeth. The follicles become closed by membranous processes extending over the margins, and form sacs which continue from the fifth month of fœtal life to the period of the eruption of the teeth at different periods after birth.

The osseous development of the teeth commences at this period. Without any preceding formation of cartilaginous substance, we discover an osseous deposit on the dental pulp, which increasing in size from the surface of the sac, augments its volume from day to day. The dental pulp, wherever it is covered with this osseous layer, has a reddish tinge, more so than its other parts. The deposition of osseous matter on the dental pulp commences either from its surface, or from the contents of the sac, probably from either; the half-liquid contents of the sac continually increasing their percentage of phosphate of lime. When the ivory shell is formed in the dental sac, the interior of its parietal layer has a villous and vascular appearance, like mucous membrane, with a thin layer of granular matter upon it, which may be considered as a sort of epithelium lining the interior of the original follicles. This surface is the matrix of the enamel; it is impossible for this substance to be produced by or from the original pulp, or from its bloodvessels, as the latter has been enveloped in the ivory shell. The enamel appears first in minute crystalline, calcareous particles. It is not very hard, nor thick at first, but solidifies gradually and adheres closely to the ivory, from which it is separated by a thin membrane, like that which is separating the ivory from the pulp.

The cement forms a thin coating around the root or fang, and is formed by the lower or alveolar portion of the dental sac, which invests the root and adheres to it. The order of development of the single teeth depends on the general rule of solidification in the fœtal body, which begins in the median line and progresses to either side simultaneously. Thus the inner incisors are formed first, and the posterior molar teeth last, with the exception of the canine, which appear later. Further, teeth in the lower jaw will develop earlier, in correspondence with the earlier ossification of the lower jaw in fœtal life. A gradual development is also manifest in the number of dental pulps: in the third month of fœtal life there are sixteen, in the fourth twenty.

After the teeth have been perfectly formed, ivory, cement, and enamel being deposited, they protrude from the jaw, penetrate the gums, and become visible in the cavity of the mouth, in consequence of the natural law of dental growth. The root of the tooth growing, the crown is propelled against the covering of the alveolar sac and the gums. The slight pressure produced thereby gives rise to gradual absorption of the osseous covering; and after this has disappeared, of the gums. By the continued growth of the root of the tooth, and by the progress in the development of the maxillary bone, the tooth is again propelled until the whole crown is visible.

The crown is the part developed first in the dental sac. With it, there is connected a thin and narrow osseous ring; this root of the tooth is gradually progressing to the depth of the dental cavity. While thus the length of the tooth is increasing downwards, the gums and the surface of the jaws are little changed. But with the progress of ossification, both in tooth and jaw, the later normal organisation of the jaw becomes manifest. The dental cavity is lengthened, its osseous wall becoming more extended. But the growth of the tooth being more rapid, it commences pressing against the osseous covering. Resorption takes place, not only of the covering bone, but of its periosteum, of the gums, and finally of the mucous membrane of the mouth. In new-born infants the gums are hard, firm, and solid; so much so, that it has long been called, though it is cellular tissue, by the term "dental cartilage." Before the cutting of the teeth, it is, as it were, their representative, being the only means of taking a firm hold of the nipple. The gums will sometimes exhibit protuberances and cavities that look very much like teeth, the more so as these prominences are generally pale and of whitish colour. The almost cartilaginous consistency of the gums disappears after birth; it gradually becomes soft in the course of a few months; its surface, instead of remaining sharp and pointed, grows blunt and thick, and even exhibits a sort of groove; being rounded only in those few cases in which the gums will be affected with an inflammatory process. After the gums have obtained their soft and loose consistency, the penetration of the teeth finds naturally less difficulty.

Eichmann reports four hundred observations on dentition, with accurate notices of the time of the eruption of the several groups of teeth. He concludes that teeth do not appear singly, but generally in groups. The period of the protrusion of the several groups is as follows:—

Inferior (middle) incisors between the 28th and 32nd week.
Superior ,, ,, ,, ,, ,, 36th ,, 40th ,,
Anterior molar teeth ,, ,, ,, 48th ,, 54th ,,
Canine ,, ,, ,, ,, ,, 16th ,, 18th month.
First posterior molar teeth ,, ,, 22nd ,, 24th ,,

At the 27th or 30th month, there are twenty teeth in healthy children.

The following table from Ashburner shows how slight is the difference in the observations of authors.

7th month . .	2 central lower incisors.
8th ,, . .	2 ,, upper ,,
9th ,, . .	2 lateral lower ,,
9th to 10th month .	2 ,, upper ,,
12th ,, 14th ,, .	4 first molar teeth.
16th ,, 18th ,, .	2 lower canine teeth.
19th ,, 20th ,, .	2 upper ,, ,,
23rd ,, 30th ,, .	4 last molar ,,

There is, in fact, but little difference between the two tables, and as a rule you will not find many deviations in healthy children.

The order which teeth generally follow in their appearance is sometimes changed. Thus Fox, in his account of the diseases which affect children during the first dentition, states that the molar teeth have protruded before the lateral incisors. Brunner, also, reports a case in which a molar tooth preceded the other teeth. Lambert found a canine tooth, the only one protruding, in an infant two weeks old, which grew, 1½ inches in two weeks. Raw mentions the case of an infant which had a canine tooth before an incisor, and Baumès reports the same anomaly to have been met with by a friend of his. Such, however, are rare exceptions to the rule, although anomalies of less extraordinary character will be found from time to time. Thus the lateral incisors will precede, sometimes, the central ones; or the incisors will first appear in the upper jaw, thus reversing the usual order, in which the lower is first to exhibit them. So regular, indeed, is the first appearance of teeth in the lower jaw, that children in whom the anomaly referred to occurs are thought to be short-lived by the common people of some countries. Naumann thinks this belief is based on experience, and is inclined to regard it as a fact; and seeking to harmonise public opinion and science, he ventures to offer the following explanation—viz., the appearance of teeth first in the upper jaw proves a precocious development of the upper jaw, and, consequently, of the whole skull; the brain participates in this premature development, and increased irritation and cerebral symptoms necessarily follow. At a later period, in this course, I shall take occasion to show how much truth there is in this popular belief, by explaining in what manner abnormities in the cutting of teeth are important, not as causes, but as symptoms, of anomalous development of the cranium in general; and in what manner the brain may be injured and life endangered by such anomalies.

A change in the order of the protrusion of the teeth is not the only anomaly that we meet with, for the *time* of their first protrusion will sometimes be found to differ much from the average age of their appearance. The first variation of this kind which I will notice, is the appearance of teeth at birth. This singular anomaly has now been observed many times, as the following examples which I have been able to collect will abundantly prove:

The younger Pliny states that the renowned Marcus Curius, consul of the Roman republic 270 years before our era, had a full set of teeth at birth. This was the reason of his being named Dentatus. The same author mentions the case of Papyrius, and of a lady, named Valeria, who had all their teeth at birth. Zoroaster, the Persian legislator, is also reported to have had all his teeth at birth. The old historians, from whom Weinrich took the facts, probably thought he was destined to become the exponent of wisdom and morals, from being so extraordinarily and precociously gifted. Louis XIV. of France, whom some writers call the Great, because he lived contemporaneously with some great men of his country, was born with two teeth; as was also his Secretary of State, Cardinal Mazarin. The celebrated Grotius, who then lived in France, prophesied that the royal baby would prove a dangerous character, and that, like the nipples of his wet-nurses, bleeding and torn by the voracious infant, the neighbouring sovereigns would be the subjects of the depredations and robberies of the future king. Scottus, in his 'Physiologia Curiosa,' relates, from a report of Nieremberg's, the case of a Spanish dwarf, who had all his teeth when born, and never lost one of them—got a beard in his seventh, and had a son in his tenth year. Old Heister repeats the report of Kauliz, of a child born with two incisors, which soon turned black; the child grew thin and emaciated, and died with rachitis when a year old. In Büchner's collections there is the case of an infant, twelve days old, who had teeth, and died soon after of a papulous and vesicular eruption, with consecutive desquamation (hereditary syphilis?). Lazoni reports the case of a new-born infant with two rows of teeth.

We learn from Schurig, that Crausius observed two incisors in the lower jaw of a fœtus in the sixth month of utero-gestation. Schenk reports a similar case. It is stated in 'Vita Peirescii,' that a woman gave birth to a child with long hair and teeth. Thomas Bartholinus is of the opinion that such congenital teeth are the cause of the vagitus uterinus. Güldenkiel reports the case of the daughter of Navinius, an officer at Camenz, who was born with two incisors. Helwich has several cases of boys born with teeth in the lower jaw; and Daniel Ludovicus relates the cases of new-born girls having teeth in either jaw, and injuring their tongues by them. Similar cases have been reported by Johann Rhodius, Gœckel, Mazarinus, Simon Majolus, Alexander Benedictus, Hildanus, Balduinus, and Polydorus Virgilius.

Gensel reports the case of a boy who was born with two incisors. Schlenck, E. von Siebold, J. Ph. Horn, Mercklin, and Storch have seen the like, without, however, mentioning the sex of the children. Vesti relates the case of his own daughter, who was born with a tooth. Detharding observed a tooth in a fœtus of six months; another in an infant three days old; and four teeth in a new-born infant. J. F. Lobstein gives the case of a child born twenty days after the ninth month of utero-gestation, with six incisors. Reveillé-Parise met with four canine teeth in an infant of four weeks, two of which had been cut before birth; the development of the other teeth was equally precocious. Meissner saw two incisors in a new-born child, one of which fell out in the course of a few days; in another case the same thing happened, but a second tooth followed soon after, both of which were firmly imbedded in their alveoli and proved to be of the same nature as temporory teeth generally. Two incisors, observed in a new-born infant in the Paris Foundling Hospital, by Billard, fell out after six weeks. Mende observed two upper incisors in an infant; they were loose and moveable, produced pain when touched; the mouth had an oblique direction, and the margins of the maxillæ were connected with each other. Although the teeth were extracted, the infant was unable to suck, and died of trismus on the fourth day after birth. Canton reports the case of a child in the practice of Dr Tomes, born with two teeth in the lower jaw, by which the breast of the mother and its own upper jaw had been injured. On examination, he found two sharp, rough incisors, protruding from the centre of the lower jaw. They were ill-shaped, imperfectly coated with enamel, and loose in the gum, and stood across, instead of in a line with the alveolar arch. They were removed, and it was found that the fangs were not more than one-third developed. In fact, the teeth had attained about the normal amount of development for the age of the child, but had protruded through the gums before they were fitted for eruption. An after-process had been effected before the preparatory one had been completed. A similar case occurred in Canton's own practice. Brown mentions the case of a child born with the central incisors through the gums. They were extracted. Two other children were afterwards born of the same mother, in each of whom the same anomaly was found. All the children were females. The teeth were allowed to remain. Crump and Lethbridge have each observed a case of complete dentition at birth; the case of the former observer occurring in a still-born negro child. The sockets were very imperfectly formed. Baumès, while quoting the cases of congenital teeth observed by Columbus, Van Swieten, Marcellus, Donatus, and Antigonus, reports the case of a French lady who bore a girl with two congenital incisors in the upper jaw, followed by two teeth on each side of the former, in the same jaw, three days afterwards. The infant died in convulsions. Richard III., and Mirabeau, the hero of the commencement of the great French revolution, had teeth when they were born. Similar cases are reported by Churchill, Fleming, Denman, while the celebrated Haller collected nineteen. I cannot conclude this long list without adding that Whitehead, the worthy professor and clinical teacher at Manchester, England, removed two teeth from the lower jaw of a newly-born infant, in order to facilitate suckling. They were reproduced at the time when the canine teeth were formed, viz., after a year and a half, instead of the usual time of seven or eight months.

(To be continued.)

PROCEEDINGS OF DENTAL SOCIETIES.

COLLEGE OF DENTISTS OF ENGLAND.

MONTHLY MEETING.—March 5th, 1861.

Dr Purland in the Chair.

[Adjourned Discussion on Mr Felix Weiss's paper 'On the Application of Hardened India-rubber to the Manufacture of Artificial Teeth.']

Mr Weiss opened the proceedings by giving a short *résumé* of his paper delivered at the last Monthly Meeting, dwelling particularly upon those points he conceived most open to discussion, and enlarging upon that part of his subject which from want of time he was compelled merely to glance at on the last occasion.

The Chairman then called attention to the importance of the subject under discussion, and trusted that the Members present would freely give the Meeting the benefit of their experience. He also begged that all visitors would consider themselves Members for the evening, and, if they thought fit, join in the discussion.

Mr Williams remarked that his experience bore out much that had fallen from Mr Weiss. He did not approve of the use of vulcanite for upper pieces, excepting in some few cases. He had noticed the shrinking round the teeth, but considered it was less where the work had been gradually cooled, than when the steam was blown off and the piece quenched immediately.

Mr Jordan said he found it difficult to add to what Mr Weiss had so ably brought forward. He had so thoroughly investigated the subject, and had practically demonstrated all that was known connected with the working of the proeess, that he considered little could be added. On one or two points he should venture a few remarks. In the first place, he must say that, although he considered this new material of great use in lower pieces, he should use it but sparingly in uppers. He showed that any ordinary flask could be made into a four-part flask, by fixing a knob of metal to the inside of the upper lid, which would unite with the centre piece of plaster.

Mr Turner considered one—the most important—consideration, was the wear of vulcanite. Will the continued action of the liquids of the mouth produce in years any change upon it? He had noticed that in time many cases lose their polish, as if the surface was affected; but how far this shows any destruction of the material he was not prepared to say: certainly it was not liable to crack, as metal plates so frequently do, and he did not consider that they were more frequently broken than other descriptions of work. The teeth were not broken, but driven off; and he strongly recommended that soft gold wire should be soldered to the platina pins in the teeth, so as to form a loop. He had also noticed the shrinking of the vulcanite round the teeth, and had tried by sudden cooling to correct it, but not with uniform success: he had tried gradual cooling, but with a worse result, and he gave some description of the various methods he had adopted to correct this serious drawback. He strongly recommended that, where the four-part flask was employed, deep grooves should be cut in the plaster, so that all superfluous rubber be expelled; and he recommended that a little French chalk should be rubbed upon the model to prevent the vulcanite from sticking, if found necessary to open the flask again. He strongly censured any direction being given as to our conduct in practice, contending that the Dentist was the best judge of what was suitable for his patient; that in benefiting his patient he benefited himself. For his part, he should use vulcanite in all cases. He saw no necessity to employ gold plates, certainly not in five cases in one hundred. He avowed, so much was he opposed to the use of gold, that he did not object to employ twice the quantity of work upon vulcanite to be released from using it. He contended that he could dispense with the objectionable gold band altogether; and so did he admire the practice of vulcanite, that he used it in every case, even in close bites, although it entailed a large amount of work, and the employment of a good deal of gold in conjunction with the vulcanite.

Mr **Henry** said he came to the Meeting fully prepared to hear the dry process thoroughly condemned, and in nothing had Mr Weiss shown his knowledge of the subject more than in his remarks upon dry heat. He had found dry heat quite successful when understood, and had employed it in every case. He considered that a great deal of our success in this process depends upon careful packing, and not packing to excess. He brought the vulcanite high up the teeth, and very rarely found any shrinkage at all.

Mr **Perkins** said he also had employed dry heat, and, for his part, had used it more than steam. He seldom if ever had a failure, and he attributed his success to the fact that he vulcanised at a low temperature, always under 300 degrees. He found that he could vulcanise at from 280 to 290 deg. with the most uniform success; but should the temperature mount over 300 deg. he felt great doubt as to the result, and at 310 he could rarely if ever ensure success. He considered that pieces vulcanised by the dry heat were darker in colour than when done by steam, but in other respects he could perceive no difference.

Mr **Hockley** had used one of Putnam's machines, the greatest drawback with which was the difficulty he had experienced in getting up the heat. On one occasion, in attempting to vulcanise, a very considerable time had been expended without getting the temperature higher than 280 deg. He at length gave it up in despair; but upon opening the machine the next morning, he found the pieces done perfectly. He understood that in America it was a common practice to vulcanise in water—that is, to fill the vessel more than half full of water; and by doing so the rubber was hardened in a much shorter time.

Mr **Chapman** had frequently vulcanised at a temperature under 280 deg.

Mr **Williams** begged to call attention to a case in which a remarkably sore mouth had resulted from wearing an upper made in vulcanite. The patient went without the piece, and the mouth got perfectly well. She once more attempted to wear it, and the same symptoms showed themselves: and thus, after repeated trials, she was compelled to throw it aside, and wear a bone piece.

Mr **Rymer** could refer to a similar case, in which he felt fully satisfied that a blistered mouth was the result of wearing a piece made in vulcanite. He could not account for it; the patient had never had anything of the kind before or since.

Mr **Hulme** could bear witness to the extraordinary irritation resulting in some mouths from the presence of sulphur. Might not this account for the symptoms noticed by some Members, seeing that vulcanite was a compound of sulphur?

Mr Turner suggested, that in all these cases it would have been a valuable experiment to have made the pieces in plain black rubber, in order to ascertain whether these symptoms were the result of sulphur, or whether they were owing to the vermilion and other ingredients employed as colouring agents in vulcanite.

The Chairman had on more than one occasion noticed the action of sulphur in the mouth, and he could also bear testimony to the irritation resulting in some cases from wearing vulcanite. Indeed, he must say he felt just as much inclined to condemn this new material as Mr Turner had praised it, excepting when used in cases where there had been great absorption. He employed the dry heat, and seldom met with a failure; he placed his thermometer inside, but he could well understand the benefit of having the heat of the flasks registered, as Mr Weiss had suggested. He certainly must express his satisfaction at the able manner in which Mr Weiss had gone into the subject, and the large amount of experimental research he had brought to bear upon the inquiry.

Mr Weiss, in reply to Mr Williams and other Members, begged to offer his explanation of the causes of shrinking round the teeth noticed by so many gentlemen. He considered it in all cases the result of overbaking: he had seen it in pieces done by the dry method, and more particularly those vulcanised at a high temperature; pieces vulcanised at a temperature of 280 deg., and under, appeared in every case he had noticed free from this imperfection. It could not be the result of overheating, or pieces in which it had occurred, done by the dry method, would be full of bubbles, which was not the case. In vulcanising by steam, he had particularly noticed that the shrinking was *never* found in pieces underdone; but he had not yet seen a piece thoroughly overdone in which this shrinking might not be found. It had been noticed that in some cases it was all on the one side, while the other remained perfectly free; this he imagined was owing to the flask touching the side of the metal chamber, and the work was being baked partly by conduction. He believed that the largest amount of shrinkage would be found in pieces overdone by dry heat; the next, those hardened in superheated steam; and the least, where the water was abundant. As far as the results of cooling slowly and quenching, it would be inferred from what he had already said, that the longer the heat was kept up, the more this defect would be noticed. Upon the wear of vulcanite he could say but little: his impression, however, was that the only change noticed was the result of friction more than anything else. He certainly had seen one piece where the surface appeared slightly honeycombed, but he had no opportunity of examining it minutely. He could not say, with Mr Turner, that he seldom if ever had a breakage: he had, he was sorry to say, frequently, and particularly in upper pieces. He had seen teeth introduced, he believed by Mr Pratt, with loops instead of pins, which could not be driven off. If Mr Turner advocated the use of vulcanite in every case, in close bites where flat teeth were employed his work could not be strictly called vulcanite; for if gold was so largely used, it was merely gold-work with the addition of a little vulcanite. Mr Turner had alluded to the objectionable gold band; but were not all bands equally objectionable? He contended that a well-fitted broad gold band would do as little injury to a tooth as bone or vulcanite, so that the band was perfectly fitted and had no cutting edges. Years ago he had tried the experiment of lining broad bands with gutta-percha; but what was the result? Teeth became sensitive, and were more affected by the gutta-percha than they would have been by the gold. He had nothing to say against a vulcanite band, but time alone would prove whether it did not produce the same sensitiveness as all bands. Mr Henry had recommended that the vulcanite should be kept high up the teeth, to prevent the shrinking: but it so happened that no piece exhibited any shrinkage until it was cut into; and the lower we cut at the necks of the teeth, the larger the opening appeared. He believed that a greal deal of difference was found in the register of different thermometers, so that 280 deg. corresponded to at least 10 degrees higher: it would otherwise be impossible to vulcanise at the temperature given in the length of time mentioned. He believed that the lowest point at which india-rubber was hardened was 260 deg.; but it would require from eight to ten hours to accomplish it. Pieces could be hardened in water raised to 315 deg. in from fifty to seventy minutes; but it was attended with great danger. He could say that he had met with but one case of irritation of the mouth which he believed resulted from wearing vulcanite, and in this case the vulcanite appeared to be mixed with some white powder like oxide of zinc: he made the work over again in Childs' G Rubber, and he never heard of any further annoyance from it. He had now to thank them for the kind attention they had given him, and hoped that on some future occasion an opportunity would present itself for entering more fully into some of the disputed points.

The CHAIRMAN, in proposing a vote of thanks to Mr Weiss, said that any remarks of his would not add to the interest they had all felt during the reading of the paper, which had been so ably illustrated by the very numerous and clever specimens that were before them. The members were much indebted to Mr Weiss for the pains he had taken, and the information he had imparted: that the paper had been most interesting was proved by the fact of an adjournment having been considered necessary. He begged to propose a vote of thanks to Mr Weiss. This was carried unanimously; and a similar compliment having been passed to the Chairman, the proceedings terminated.

ODONTOLOGICAL SOCIETY OF LONDON.

ORDINARY MEETING.—MARCH 4.

W. M. BIGG, Esq., President, in the Chair.

THE Monthly Meeting of the Members of the Odontological Society was held on Monday evening, March 4th, 1861.

Mr BRIDGMAN, of Norwich, read a paper on 'Caries and its Treatment.' The writer commenced by observing that there are few points connected with the practice of Dental Surgery which have given rise to so much conflicting opinion as the cause of decay. Its precise nature and origin have long been a disputed question. It has been regarded, by one section of the Profession, *not as disease*, but as being entirely due to the effects of *external chemical action*—that is, produced by the solvent power and corroding effects of some acid, generated in decaying food, lodged between and around the necks of the teeth, and finding access to the dentine, through natural or artificial openings in the enamel. Another section, viewing the teeth as organic bodies, having a strong analogy to ordinary bone, consider decay as a disease resulting from morbid action upon a vitalised organisation.

It is scarcely necessary to observe that these hypotheses, neither separately nor combined, are sufficient to account for decay in all its various phases, and that some further explanation is needed to satisfy the main bulk of the Profession.

After reviewing the various opinions which had been held with regard to the nature of the teeth, the writer proceeds to say, that in Fownes' 'Manual of Elementary Chemistry' it is stated that "azotised albuminous substances, which, in a more advanced state of putrefactive change, act as alcohol ferments, often possess, at an earlier period of decay, the property of inducing an acid fermentation in sugar, the consequence of which is the conversion of that substance into *lactic acid*;" and, again, that "*moist animal membranes in a slightly decaying condition often act energetically in developing lactic acid.*"

Now, as so large a proportion of our food contains sugar, or substances capable of being converted into it, and "*the moist animal membrane in a slightly decaying condition*" being provided by the dead portion of dentine, we have thus brought together under the most favourable circumstances the elements requisite for the production of an acid. Respecting this compound, Professor Brande says, "lactic acid has a considerable solvent power over phosphate of lime;" therefore we have not only the production of an acid, but the formation of one capable of dissolving out the earthy constituents of the dentine. But there is here one condition requiring especial notice. Moisture is so essential to chemical action, that few chemical changes can occur in its absence: thus, while the dead membrane can remain comparatively dry, it is able to resist this change; but so soon as it becomes charged with additional moisture, the change suspected by Hunter will speedily follow.

When speaking of the process of stopping, Mr Bridgman stated he believed it had never before been suspected that the prepared cavity in most cases still bears strong traces of an acid. That it does so, is proved by the rapid action upon a metallic paste stopping. Most of the metallic oxides are soluble in lactic acid, and photography has taught us that many of these are darkened by the action of light, &c. Therefore, neutralising the acidity in the cavity prior to the use of an amalgam *ought* to prevent its becoming discoloured. This he had long since proved to be the fact, and that with *proper care* the mercurial stoppings or amalgams may be used even to the front teeth, as well as in those of delicate texture, without the slightest trace of discoloration. After clearing the cavity of so much of the softened dentine as may be needful, a small portion of a paste composed of chalk and magnesia is placed in the cavity, with as much moisture as will suffice to form a creamy consistence. The cavity is then filled lightly with lint, and this is suffered to remain until the stopping material is ready. Of course, the state of the tooth must regulate the length of time necessary to effect its completion; but in ordinary cases five or ten minutes will be sufficient. The cavity must be well syringed out with hot water several times previous to being dried finally for the stopping. Under any circumstances, he almost invariably had recourse to an alkali previous to plugging, and he rarely or never found discoloration follow when this had been carefully attended to.

He concluded by observing—That the human teeth are *not* merely *dermal appendages*, but a portion of the cutaneous system, all parts being so modified as to be peculiarly adapted to the altered circumstances in which they are placed and the special duty required of them.

That *decay* is the natural death of the organic basis, or basement membrane of the dentine, and consequently a *vital phenomenon.* And that, subsequently, the presence of moisture in the dead membrane leads to the development of *lactic acid*, which is the cause of its progressive tendency, and that a more correct definition, instead of the term "*caries*," will be "*vital decay*" so long as it retains its primary character, and "*chemical destruction*" when acidification has commenced.

That artificial dentures of organic materials are subject to the same laws, and owe their destruction to precisely the same cause as do teeth in their sockets.

That the epithelial cells, from the membrane of the gums, &c., also lead to the development of lactic acid, and are the cause of that destruction of the enamel so often met with in the upper front teeth. And that the formation of new dentine, or "calcification," as it is termed, is the result of the common law by which inflammatory lymph leads to the production of new tissue, and is consequent upon irritation caused by external agents acting upon the pulp and its dentinal fibrils. And to point out that the proper neutralisation of the acid remaining in a decayed tooth, *prior to filling*, will not only render the stopping far more likely to prove successful, but will wholly prevent the dark stain hitherto considered one of the unavoidable accompaniments of amalgams, and thus render this class of stoppings infinitely more valuable to the Profession.

The PRESIDENT having remarked that the time was so far gone as to leave but little opportunity for discussing the paper, on the motion of Mr Tomes, seconded by Mr Underwood, the subject was adjourned until the next Meeting.

AMERICA.

(Letter from our American Correspondent.)

Our three Dental Colleges have had their annual "Commencements," which terminate the session, and the following is the result:

The Baltimore College had a class of *fifty-eight*, from which *twenty-nine* graduated. In the class were representatives from fifteen of our own States, also one from England and one from Prussia.

I have not been able to obtain a report of the operations in the clinical department of this school; an important feature in the instructions afforded the students.

The Pennsylvania College of Dental Surgery had a class of *sixty-three*, of which *thirty-six* graduated. The class here represented seventeen States of the Union, also two from England, two from Germany, two from Cuba, one from Switzerland, and one from Turkey.

The Demonstrator's report (operative department) shows 567 patients treated during the session, and which includes 720 gold and 360 tin fillings (consuming over twelve ounces of gold oil). Treatment and filling of pulp cavities, 176; extraction of teeth and roots, 3,129: also removal of salivary calculi; insertion of pivot teeth; treatment of inflammation of gums, alveolar abscess, and irregularities.

In the mechanical department, the Demonstrator reports, whole sets of teeth inserted, 14; upper sets, 62; upper sets of blocks, 4; partial sets, 79; irregularity plates, &c.; whole number of teeth mounted, 2,039.

All this affords satisfactory evidence of the advantages enjoyed by the student of not only seeing, but performing all the various operations incident to his Profession; or, as expressed in the valedictory, a very appropriate address to the graduates by Professor Calvert—

"Experience or practice in each department of our Profession has been *your* privilege as a legitimate part of *our* instructions. Not only have you witnessed in the hands of others the various operations and manipulations, but as well have you performed them and repeated the same, until a degree of proficiency has been attained by you which none but the facilities of collegiate instruction could adequately supply."

From the Cincinatti School I have no report, but trust their class has been commensurate to the acknowledged ability and industry of the Faculty.

There appeared, some time since, in a number of the REVIEW, a notice of collodion as a base for artificial teeth. Can you, or any of your readers, give anything additional on this subject by which experiments may be directed, and as to its utility or success in practice? Some inquiry has been made about it here, which you may possibly be able to satisfy.

The 'Handy Book' issued in London, a copy of which I have had the pleasure of examining, is a very useful compilation, containing a large amount of information on professional matters, beside the very simple but ample arrangement for noting engagements and operations—all of which renders it indispensable to the Dentist, and should secure for it a large sale.

Dr Richardson's work on Mechanical Dentistry has been favourably received. It fills a void too long existent in the Profession, and must therefore obtain general circulation, which its merits will fully warrant.

Philadelphia, March 7, 1861. Yours, * * *

QUARTERLY DENTAL RETROSPECT.

JANUARY TO APRIL, 1861.

IN commencing our Quarterly Retrospect of the events of the last three months relating to Dental Practice, we find ourselves compelled to dwell exclusively upon the surgery and pathology of the Profession. We trust that we shall hereafter obtain the assistance of our fellow-practitioners, and that they will help us to perfect our Retrospect, by forwarding an account of cases of special interest which may come under their notice, of any new modes of treatment they may have adopted, or of any mechanical improvements they may have introduced into the work-room.

I.—*Fibrous Tumour of the Left Superior Maxilla, involving the Antrum, of Fifteen Years' Growth. Successful Removal.*—Mr FERGUSSON. ('Lancet,' Jan. 5, 1861.)

G. C., aged fifty-five, was admitted May 30th, 1860, into King's College Hospital, under the care of Mr Fergusson, with a tumour of the left superior maxillary bone, which had first appeared fifteen years previous to his admission, about half an inch below the inner angle of the eye. This increased very slowly in size for about seven years, by which time it had only attained the dimensions of an almond. The growth was now removed by operation. From this time he suffered no pain or inconvenience from the part, and enjoyed good health until six months before admission, when the occurrence of shooting pains in the left cheek drew his attention to the part, and he discovered a small swelling in the situation of the disease which had been removed. This had gradually increased until the date of his admission, when it was found to involve the left superior maxillary and malar bones, and projecting slightly into the left nostril, somewhat impeding respiration through it. The tumour was hard to the touch, not very tender, and caused him comparatively little pain.

On June 2nd, chloroform having been administered, Mr Fergusson proceeded to operate in the following way:—A horizontal incision was first made (in the wrinkles of the lower eyelid) from the malar bone to the side of the nose; the line of cut was then directed at right angles to the first, down the side of the nose, and, following the curve of the nostril, to the middle of the upper lid, which was then divided by a vertical incision. The flap thus made was then reflected outwards, and the tumour exposed. This was found to occupy the left antrum, the anterior wall of which was absorbed, allowing the growth to protrude. The removal of the tumour, which was begun from the inner side, was effected without difficulty by means of semicircular bone-forceps. Part of the orbital plate of the upper jaw bone was absorbed; a large portion of what remained was removed by Mr Fergusson, as was also part of the malar bone and the nasal process of the superior maxillary. The floor of the antrum was found quite healthy, and, therefore, left entire. The wound in the lip was then brought together, as in hare-lip, by means of needles and a twisted suture, and the rest of the wound closed by means of silk sutures.

June 5th.—All the sutures were removed, firm union having taken place. There is a free discharge from the nostril. He expresses himself quite free from pain.

The patient progressed rapidly without a bad symptom, having suffered very little inconvenience from the operation. He was discharged on the 8th of July, cured.

II.—*Fibrous Tumour of the Left Superior Maxilla, involving the Antrum. Removal. Fatal Result.*—Mr FERGUSSON. ('Lancet,' Jan. 5, 1861.)

W. P., aged sixty, a man of colour, a native of and resident in Barbadoes, was admitted June 2nd, 1860, into King's College Hospital, under the care of Mr Fergusson, with a tumour of the left superior maxilla. The swelling was first noticed twelve months ago; but for six months previous he had been suffering much pain in the part, for which he had had several teeth extracted. Patient is in pretty good health, but has been losing flesh of late. On admission, there is a hard and immovable swelling under the left eye, caused apparently by a tumour in the antrum, protruding its anterior wall. It encroaches on the left nostril, interfering with respiration through it. There is paralysis of sensation on the left side of the face and upper lip. The pain is constant and excessive.

June 9th.—Chloroform having been first administered, the two remaining incisor teeth were extracted, and Mr Fergusson proceeded to make an incision, beginning over the malar bone, and extending horizontally inwards to the inner canthus of the eye, in the wrinkles under the lower eyelid. This was continued by a vertical incision, following the curves of the nostril to the septum of the nose, where it was terminated by a vertical cut down the centre of the upper lip. The structures down to the tumour, included in the flap thus made, were then reflected outwards. Mr Fergusson then cut through the palatine plate of the superior maxillary bone with semicircular bone-forceps; the malar bone was then divided with the same instrument, and one or two more touches of the forceps sufficed to separate the tumour from its attachments. Various portions of diseased bone were then clipped away, amongst which was the whole of the malar bone, which Mr Fergusson found it necessary to remove. The hæmorrhage was free, but was soon stopped by the actual cautery. An examination of the tumour showed it to be a fibrous one.

The patient bled on two occasions, but did well in other respects, being kept up with enemata of beef-tea and brandy until the 25th of June, when purulent ophthalmia occurred in the left eye, the conjunctiva appearing wrinkled ever the cornea, and hypopion becoming evident.

July 6th.—The patient is much weaker. The cornea appears to have ulcerated, and allowed the aqueous humour to escape. The crystalline lens also was found sticking to the eyelashes this morning.

During the next three days the patient sank rapidly, and died exhausted on the 9th of July.

III.—*Fibroid Growth imbedded in the Alveolus of the Lower Jaw. Successful Extirpation.*—Mr Bowman. ('Lancet,' Jan. 5, 1861.)

G. E., aged twenty-seven, a gardener, living in the West of England, was admitted into King's College Hospital, under the care of Mr Bowman. Nine years ago, a lower molar tooth on the right side became loose, and was extracted. Shortly afterwards, a tumour of the size of a hazel-nut appeared in the socket of the tooth. At the end of a year, by which time it had become of the size of a fist, he applied to a surgeon, who removed part of it by the knife, and then applied nitric acid, painting the cheek over the tumour with iodine. In eighteen months it had disappeared, and there was no return for six years. Twelve months ago, he struck his right cheek with the corner of a spade. This appears to have started the growth afresh, for from this time forth the tumour began to grow in the old situation, and soon attained its original size. It now gave him very much pain, and prevented his opening his mouth further than to admit a finger. In May last the swelling softened, and he states that large portions of the tumour came away. Since that time it has remained in its present condition.

On admission, there was externally a firm round swelling over the lower jaw, protruding the cheek. Seen from within, there is a tumour extending from the back bicuspid tooth as far back as the base of the coronoid process, and it appears to spring from the alveolar region of the lower jaw. Its upper surface is divided by chinks into three or four lobes, and there is a deep furrow down the centre, where the teeth of the upper jaw have pressed upon it.

October 20th.—Chloroform having been administered, Mr Bowman made an incision six inches in length, commencing in a vertical direction one inch below the lip, in front of the growth, and carried it downwards and then outwards beyond the base of the jaw, curving it upwards to the extent of three-quarters of an inch, so as to embrace the whole extent of the tumour, but not so deep as to divide the facial artery. The mouth was then entered by raising the end of the flap in front, so as to make way for the saw, and the jaw was divided vertically, partly by the saw and partly by cutting forceps. The flap was next raised in its whole extent, the facial artery tied, and the mouth laid open as far as the back of the tumour. The jaw was now divided behind the tumour, as in front, by means of the saw and forceps, three or four small vessels were tied, the mucous membrane of the cheek united by two sutures to that reflected from the tongue to the alveoli, and the skin also united by a line of sutures. The jaw, which was now found to have fallen inwards by the action of the masticators of the left side, was brought into place, and maintained there by means of a gutta-percha apparatus fitted between the teeth of the left side. A bandage was passed under the chin to keep the mouth closed.

The tumour thus removed was found to be of a firm fibroid and apparently simple epulis growth, imbedded in the alveolar aspect of the jaw. The original sockets of the teeth had disappeared, and the sides of the bone, as far as the lower margin, were expanded laterally to the width of two inches, the terminal edges forming an irregularly shallow cup, with sides no thicker than silver paper.

The patient went on, after the operation, without a bad symptom, and was able to take fluid nourishment from the first. The sutures were all removed by the 25th, the anterior part of the wound having healed by first intention.

Oct. 29th.—The wound is discharging freely, the ligatures have all come away, and he now gets up daily. The gutta-percha socket is, however, still kept in the mouth, and he is not yet allowed to use the jaw.

Nov. 5th.—The wound has quite healed. The gutta-percha socket has been removed, and he can chew meat, though not firmly as yet. The lower part of the face is a little distorted, the left corner of the mouth being drawn downwards, and the right cheek dropping slightly from the paralysis of the portio dura: he can, however, whistle. When the teeth are clenched, the middle line of the lower jaw is seen to be opposite the middle of the first upper incisor of the right side, and he has the power of moving the lower jaw laterally to the extent of half an inch.

10th.—Improving in every respect. Discharged this morning.

IV.—*Cystic Disease of the Lower Jaw, of Twelve Years' Duration. Extirpation of the Right Half.*—Mr Paget. ('Lancet,' Jan. 5, 1861.)

A woman, aged forty-eight, was admitted, in August, 1860, into St Bartholomew's Hospital, under the care of Mr Paget, for cystic disease of the lower jaw. The disease commenced twelve years before as a slight swelling of the ascending ramus of the angle. Nothing was done then, and the swelling slowly increased. Eight years from the commencement, however, the disease had increased to such an extent that she was sent to the above hospital. The growth was then as large as the one for which she was last admitted, producing a general enlargement on the right side of the jaw and cheek. Mr Paget, on that occasion, considered the propriety of removing the bone; but as he found that the disease then consisted of one large cyst only, he merely removed the anterior wall, filled the cavity with lint, and left it to suppurate. By this treatment the disease was so far for a time cured. She remained well for two years, when another cyst was found a little higher than the first. This was treated in the same way, and she again got well. She remained so for twelve months. The disease, however, reappeared, and continued increasing until her admission for the third time. It now involved the right lower jaw, from the first molar tooth to the angle. Above the angle the bone could scarcely be said to exist; but there were one or two cysts. The zygoma was nearly destroyed, only a small part (two small stumps) being left. Mr Paget made a vertical incision through the soft parts, on the right side of the symphysis, carrying it along the lower edge of the horizontal ramus to the angle. He next cut through the bone, partly by the saw and partly by the bone-cutting forceps. He divided the parts of the angle, and removed the diseased horizontal ramus. He then cleared out the remains of the cysts which occupied the position of the ascending ramus, pursuing it as high as the zygoma. The vessels requiring ligature were rather numerous. Mr Paget, in his remarks after the operation, stated that the duration of the disease and the general features of the case clearly showed that the growth was not malignant, otherwise he should long ago have removed the bone.

V.—*Malignant Disease of the Upper Jaw, involving the Antrum, Nose, and Orbit. Partial Removal.*—Mr Skey. ('Lancet,' Jan. 5, 1861.)

A cachectic man, of middle age, was brought into the operating theatre of St Bartholomew's Hospital, on the 17th of March, 1860, to have a tumour removed which involved the lower wall of the orbit and adjacent parts. Mr Skey excised the eyeball, and removed piecemeal portions of a large growth which had destroyed the floor of the orbit, and perforated into the antrum and nares. Two months before this, the patient had undergone an operation in which a large polypoid mass was removed from the nose, the nostril having been laid freely open to allow of access to its base. At that time a hope was expressed by Mr Skey that the disease was not malignant, and would not return, although, as he stated, he had some misgivings on this point. The parts healed, and the man remained without a sign of recurrence of the growth for about a month.

After the second operation, Mr Skey stated that the very early return of the growth and its rapid increase in size left no doubt as to its true nature. The disease had originally begun in the nose, but even at the time of the first operation there was a perforation of the orbital plate of the ethmoid bone. The edges of this perforation were, however, abrupt and definite,—not broken down as if the bones were infiltrated with deposit. Mr Skey therefore hoped that it had been caused by pressure only. At the second operation, however, both the floor and inner wall of the orbit were found wholly destroyed, and the diseased growth extended into the antrum, nose, and orbit.

Mr Skey remarked that he had, he feared, not accomplished much by the last operation. It was, however, an exploratory one; and had he been aware before commencing it of the extent to which the disease had advanced in all directions, he should probably not have undertaken it. To have excised the bones freely would, however, have been, if not impracticable, at any rate attended with extreme risk.

The diseased portions now removed were found to be, on examination, cancerous in their nature, and were soft and vascular. The patient subsequently left the hospital.

VI.—*Epithelial Cancer of the Lower Jaw, for which One half of that Bone was excised. Good Recovery.*—Mr Adams. ('Lancet,' Jan. 5, 1861.)

James B., aged forty-nine, a short, stout, healthy-looking man, was admitted Sept. 20th, 1860, into the Great Northern Hospital, under the care of Mr W. Adams, suffering from a tumour of the lower jaw on the right side, evidently connected with the bone at the angle of the jaw, and involving part of the horizontal ramus. Externally, the swelling was very considerable in the direction of the bone and towards the cheek. The skin was slightly reddened, and the integuments hard and brawny, evidently from inflammatory infiltration. This induration extended a little on to the neck, but the glands did not appear to be much enlarged. Internally, when the mouth was opened, which could only be done with difficulty, great enlargement could be seen: at the back part, this evidently depended upon a growth from the angle of the bone, of a soft, fleshy-looking character, projecting upwards and backwards, and closely adapted to the right half of the soft palate. Anteriorly this internal enlargement presented only the character of a common abscess. It had been freely opened by Mr Wallis, the house-surgeon, the day before the man's admission, and about an ounce of healthy pus let out. When first seen by Mr Adams, this abscess was discharging freely into the mouth, and appeared to have a considerable cavity, as ascertained by passing a probe into it.

Mr Adams considered that much of the general enlargement and induration of the integuments depended upon inflammatory infiltration, probably caused by necrosed bone, though this could not be distinctly felt; and, from the combination of abscess with the morbid growth, he took a comparatively favourable view of the case, as opposed to the idea of the malignant or cancerous nature of the disease.

History.—The man stated that between three and four months previously he perceived a small painful swelling, resembling a gum-boil, near to the angle of the jaw. At first he took but little notice of it; but in two or three weeks it increased in size, became very painful, and caused great inconvenience to the movements of the jaw. He then applied at the Royal Free Hospital, and was admitted as an out-patient. The mouth could only be partially opened, and with much pain. Two of the molar teeth on the affected side, being loose, were extracted by the house-surgeon, Mr Hill, who states that at this time the tumour was about the size of a pigeon's egg, of a soft, spongy-looking character, and attached to the jaw apparently by a pedicle; it presented the general appearances of an epulis, and a portion of it examined under the microscope was seen to consist only of simple epithelium. The patient discontinued his attendance at this hospital, and remained without further treatment until he applied to the Great Northern Hospital on the 18th September. In the mean time the tumour had very rapidly enlarged, and the pain and inconvenience, especially as to the difficulty of taking food, were greatly increased.

After admission, the case was watched for a week, during which time the morbid growth very perceptibly increased, and a consultation was held, which resulted in four out of five of the surgeons agreeing that an external incision should be made, and as much of the bone, together with the morbid growth, be removed as might appear advisable.

On the 27th September, 1860, Mr Wm. Adams proceeded, when the patient was fully under the influence of chloroform, to make a deep semilunar incision, four inches in length, in the direction of the bone. It was now evident that the morbid growth, which presented very much the appearance of soft cancer, traversed by bands of fibrous tissue, largely implicated the bone, which was partially destroyed at the angle, and therefore he immediately decided to disarticulate and remove the right half of the lower jaw from the symphysis, where the bone was quite sound. This was readily accomplished in the ordinary way; though, in consequence of the depth to which the growth extended in the pterygomaxillary region, the hæmorrhage was greater than generally occurs when the bone is excised for hard circumscribed tumours.

The man progressed very favourably, and without any secondary hæmorrhage or other interruption. On the 10th he was able to eat a mutton chop, and the wound presented a healthy, granulating appearance. The thickening and induration of the integuments gradually subsided, and cicatrisation proceeded favourably. On the 2nd November the wound was nearly closed, and the man left the hospital.

At the present (Nov. 22nd) the wound has a firmly-cicatrised, contracted, and deeply-puckered appearance, except at one part, where a small aperture communicates with the mouth, like a fistulous opening: this will probably be closed in a short time. The surrounding induration has subsided in a most favourable manner.

The tumour was submitted to the Pathological Society on Oct. 23rd, and described by Mr Adams as an example of epithelial cancer; and in a further report of the specimen, made at the request of the Society by Dr Wilks and Mr Holmes, this opinion was confirmed. The tumour was of soft consistence, more or less lobulated in form, and on section presented a uniform white colour, its structure being traversed by dense fibrous bands, having an irregular reticulate arrangement, forming meshes in which the soft tissue was contained. The arrangement was obvious to the naked eye, and still more so under a low magnifying power. Microscopically examined, the soft tissue, whether taken from the central portion or near to the surface, exhibited the ordinary characters of epithelial cell formation—*i. e.*, epithelial cells of all forms and sizes, masses of clear polygonal cells, with round or oval nuclei in some parts, and in other portions small round or oval nuclei, best seen after the addition of acetic acid. Good specimens of the laminated capsules met with in epithelioma were not obtained, but some rounded masses resembling these were present. No myeloid cells were seen, even in the portions of the morbid growth which extended into the interior of the horizontal ramus of the jaw. The fibrous bands consisted of simple fibrous tissue, as well as of nucleated fibres.

The tumour was intimately connected with the bone, and not only extended outwards, but had eaten its way into the substance of the jaw, entirely destroying the bone from the angle to within an inch of the symphysis, where it filled the cavity of the bone. In the operation, some portions of the bone were found nearly detached and broke away; and this condition had probably given rise to much of the common inflammatory mischief and the abscess, which tended to obscure the diagnosis of the precise nature of the morbid growth. The bone was quite healthy where sawn through near to the symphysis.

VII.—*Fibrous Tumour of the Superior Maxilla in a Girl. Sucessful Removal.*—Mr Quain. ('Lancet,' Jan. 5, 1861.)

E. M., aged fifteen, was admitted, April 28th, 1859, into University College Hospital, under the care of Mr Quain. In the summer previous, she was struck on the left side of the nose by a shutter: the face swelled, but quickly got well, and nothing was noticed till the Christmas following, when she perceived that the same side of her face was enlarged. A month later, she observed a swelling on the gum, and went to a surgeon, who extracted the left lateral incisor, and afterwards lanced the gums, letting out some matter.

On her admission, there is found in the soft parts on the left side, along the side of the nose and below the eye, a swelling of the size of a flattened walnut. It extends inwards, encroaching on the ala of the nose, and reaches to within a finger's breadth of the margin of the lower eyelid; it covers the body and anterior surface of the superior maxillary bone, and is continued down to the gum. When the lip is raised, several decayed teeth are seen—two middle incisors and one lateral; and on the left side, where several teeth have been removed, a considerable swelling is found projecting on the anterior surface of the alveolar process. This is elastic to the touch beneath the integuments, and yields distinctly all over the surface. There is also a degree of elasticity at the lower margin of the gums, in the space unoccupied by teeth. There is no change in the roof of the mouth. A very slight degree of fulness is perceived in the left nostril. The glands in the right axilla have been enlarged for some time; those under the angle of the jaw are also enlarged. There is no pain, and the patient is very anxious to have the growth removed.

May 19th, 1859.—The patient being narcotised with chloroform, Mr Quain made an incision through the integuments, extending from half an inch below the inner angle of the left eye to the angle of the mouth, and dissected back the flaps on either side, so as completely to expose the tumour. The bone was then divided in the middle line, and again obliquely behind the growth. The part included by these was removed by means of a cross cut above. There was a good deal of hæmorrhage, but it was controlled by the free application of the solution of the perchloride of iron. Six hours afterwards, the flaps of skin were brought together with hare-lip pins and sutures. The nature of the tumour was believed by Dr Jenner to be fibro-plastic.

After the operation, the patient progressed most favourably. The external wound was quite healed by the 1st of July. The cavity was considerably closed by the 23rd of the same month, without the appearance of any secondary growth. There was no deformity, and the patient left the hospital. On presenting herself at the hospital, on the 29th of November, she was found to have grown, her face was fuller, and the opening into the antrum was perfectly sound.

VIII.—*Successful Excision of the entire Upper Jaw and Malar Bone, for an enormous Tumour involving both, and filling the Parotid Region.*—Mr G. H. Butcher. ('Dublin Quarterly Journal,' Feb., 1861.)

Thomas D., aged forty-five years, was admitted into Mercer's Hospital, under the care of Mr G. H. Butcher. The man's countenance presented a very frightful deformity, owing to an enormous tumour, involving the left superior maxillary and malar bones, and filling up the parotid region on the same side, implicating, far and wide, the important parts traversing the space.

The disease had commenced, two years previously, by a dull, heavy pain in the upper jaw, under the floor of the orbit, and to the outer side of the canine depression. It soon became more acute and violent, usually located in the site of the two last molar teeth. This continued for six months—often preventing sleep altogether, frequently impairing it for nights in succession—yet all this time there was no swelling, no enlargement. At the seventh month the tumour took on a sudden increase, and the pain was aggravated and spread to the eye, ear, nose, palate, and throat; the whole countenance became hideously distorted. The tumour was now as large as the two clenched fists: springing from within the antrum, it forced out its walls in every direction, infringing on every neighbouring cavity. Besides its outward projection, it blocked up the left nostril, and the palate plate was thrust down upon the tongue three-quarters of an inch below its normal position. The orbital plate of the maxillæ was bulged upwards, partly dislocating the eye from its normal position, and greatly impaired the power of vision. The tumour was removed on the 14th of March, 1860.

The man being seated in a strong, heavy arm-chair, his feet were raised a few inches from the ground, and lashed to the corresponding legs of the chair, while his arms were secured to it laterally and behind. To prevent any upward movement, a strong slip of wood, about four inches wide, was passed under the arms of the chair, and across the thigh.

A sheathed bistoury was passed into the mouth, as far back as the malar bone, and the mouth laid open from within outwards down to the left commissure. This incision did not at all reach high enough, and was therefore prolonged, by means of the scalpel, over the tumour, up to the junction of the frontal and malar bones. The knife was then carried backwards and outwards along the zygomatic arch, as far as its tubercle or junction of the two roots. The superior flap was dissected off the tumour, commencing in front, and detaching with it the left ala of the nose from its bony connections. Upwards, it was removed, so as clearly to reveal the lower segment of the osseous margin of the orbit, and the forced-up plate constituting the floor of that cavity. The lower flap was next attacked, commencing at the angle corresponding to the outer wall of the orbit, and dissected downwards and backwards. As the dissection was carried back, the whole parotid region was exposed, being filled up by the excessive growth. The lower flap had to be set free, and thrown down considerably below the angle of the jaw, before its superficial outline could be revealed in its entire extent. The man now got copious draughts of wine; for although no blood was lost, yet the shock manifestly produced a very decided effect, though these proceedings were executed with all the rapidity with which the knife could be made with safety to travel.

When the diseased mass was fairly exposed, it was seen that the entire left maxillary bone, together with the malar, with their several and wide-spread processes, were all hopelessly seized upon, and made parcel of, and distorted in its increase. The bones were divided by passing one blade of a long, narrow bone-forceps into the corresponding nostril back into the pharynx, the other into the mouth. The nasal process of the maxilla was next clipped across, at its junction with the frontal bone. The forceps was next applied to the orbital margin, at the junction of the malar and frontal bones on the outside, and the division made into the spheno-maxillary fissure. The zygomatic process of the temporal bone was then cut across, just in front of its tubercle. Spreading the end of a towel upon the tumour, so as to prevent the hand slipping, the operator then seized the maxilla, getting the thumbs well in upon the dense orbital margin, and broke down the entire mass from its posterior attachment. The detachment of the nasal, orbital, and palate plates was all that could be desired; and then, by a few semicircular wrenches and breaking down of parts, by the index finger passed far back, all connections were safely set free, even into the pharynx; and the wrenching of the parts lacerated the vessels so, that no bleeding of any consequence ensued. This was all very well as regarded the anterior and mesial attachments of the tumour; but its most dangerous relations were deep in the parotid space. Behind, the growth covered the external carotid, which was pressed somewhat backwards and deeper than its normal course; in connection with their primitive trunks passed their corresponding veins, while surrounding it on all sides were vessels of magnitude and nerves essential. With great care the tumour was freed from these attachments: but little blood flowed during the outer and posterior dissection; a couple of large vessels had to be ligatured, but not one on the inside. No remains of the tumour could be detected in the extensive chasm, and the entire raw surface was then cauterised with the hot iron. Mr Butcher considers that the cautery is not used as much as it should be in operations about the mouth. In all instances, whether there be hæmorrhage or not, whether the growth be suspicious as to its characters of malignancy or not, he invariably uses it, and that freely. If, he says, there be hæmorrhage, its application arrests the flow; if parts are suspiciously malignant, it destroys contaminating radicle—tendency to recurrence; if no bleeding or malignancy, its touch quickly arouses an inflammatory action, healthy in its action, vital in repair. He has no doubt, by this rapid healthy change, destructive, diffuse, erysipelatous forms of inflammation are guarded against. During the latter stages of the operation, the patient was supplied with brandy, and demanded it with a liberal hand. The wound having been dressed, the patient was then removed to his bed. An examination of the tumour showed that it was not malignant. The patient's progress to recovery was uninterrupted.

On the 10th of April—that is, three weeks after the operation—the man was up and walking about the ward. The cheek healed accurately throughout, somewhat flattened, being slightly corrugated about its centre: but the eye remained admirably supported, and following its fellow in all its motions; and the lids retained their place, and performed their functions as if the parts had never been meddled with. On looking within, the surfaces are all covered with healthy granulations, and almost finally repaired. The functions of deglutition are well performed, and every day he is obtaining the power more and more of eating solids and swallowing the bolus without hesitation, while fluids pass backwards without the slightest regurgitation through the nostrils. The speech also was becoming distinct, and he found no difficulty in expressing his wishes.

A few days later, the man was up and walking about the ward; and at the end of six weeks from the date of the operation, he was sent home to the country perfectly cured.

IX.—*Necrosis of the Lower Jaw, occurring in a Lucifer-match Maker.*—Mr Stanley. ('Medical Times and Gazette,' Feb. 16, 1861.)

The following case appears to be one of those in which necrosis is produced by the fumes of phosphorus. A boy, aged nineteen, a patient of Mr Stanley's, has been four years in the trade, his part of the work having been piling the matches after they were dipped. The fluid in which they are dipped consists chiefly of an emulsion of phosphorus in glue, with chlorate of potash or oxide of manganese. The mode in which the phosphorus acts so as to produce necrosis of the lower jaw is a disputed point. Some assert that the fumes are only hurtful when they come in contact with the periosteum or the alveolus, and hence that those who have bad teeth often suffer. Others hold that the phosphorus is inhaled, and thus acts on the jaw as mercury does on the salivary glands, or lead on the muscles. Mr Stanley's patient says he had no bad teeth before the disease began; but we cannot place much reliance on his statement, as he would not be likely to know whether the disease produced the decay in his teeth, or the decay preceded the necrosis. It is clear, however, that he has lost several teeth since which are not decayed. The disease is on the left side only. Several pieces of bone have come away, and all the teeth in this side, from and exclusive of the bicuspid, have come out. There is now much swelling of the face on this side, and a sinus in the cheek leading down to dead bone. The necrosis does not appear to extend much beyond the alveolus. He has generally had good health, and since the necrosis has not had worse health than usual. He is taking the iodide of potassium.

The red amorphous variety of phosphorus does not emit any fumes, and does not so readily take fire. Attempts have, therefore, been made to use this form of phosphorus instead of the ordinary one in making lucifer-matches. Should they succeed, it may be expected that cases of similar nature to the above will be much less frequently met with.

X.—*A Tumour and Portion of the Lower Jaw removed by Excision.*—Mr Spencer Wells. ('Medical Times,' Feb. 23rd, 1861.)

At the meeting of the Pathological Society, Feb. 19th, 1861, Mr Spencer Wells exhibited this specimen, which he had removed a week before the meeting from a female patient, twenty-seven years of age. Photographs of the patient, taken before the operation, were also exhibited. The tumour had been of four years' growth, but had only grown rapidly during the last twelvemonth. About a month ago, Mr Hulme had extracted a tooth, bringing with its root a portion of the tumour, which portion on examination proved to be purely fibrous. It was determined, therefore, to remove it, with the portion of jaw implicated; and Mr Wells, after exposing it by a single incision along the base of the jaw on the left side, divided the bone close to the symphysis and near the angle, and thus removed the whole of the disease. The patient had gone on remarkably well, the incision having nearly all healed by first intention.

A point of considerable interest in this operation was the mode adopted by Dr Richardson in the administration of chloroform. The patient was first placed fully under the influence of the anæsthetic in the usual manner. The mouthpiece was then removed, and a flexible tube having been attached to the inhaler, furnished with a nozzle of wood of such a size as to be capable of passing up one nostril, the patient continued to inhale the chloroform during the whole operation, without in any way interfering with the manipulations of the operator. This method of administering was first proposed by M. Faure, at a meeting of the Société de Chirurgie, in 1859; and it seems surprising that it has not been previously adopted in these formidable operations upon the jaws. The patient remained perfectly unconscious during the whole of the operation, and her condition must have formed a marked contrast to the frightful sufferings which the unhappy man underwent whose case is recorded above.

XI.—*Reproduction of the Left Half of the Lower Maxilla.*—E. S. Cooper, A.M., M.D., Professor of Surgery at the University of San Francisco. ('American Medical Times,' Feb. 23rd, 1861.)

A little girl, seven years of age, having been attacked with bilious fever, the medical man in attendance administered largely of calomel, which produced a most severe and protracted ptyalism, resulting in sloughing of the alveoli on both sides of the lower maxilla, as also that of part of the upper. The affection of the lower jaw continuing, necrosis of one half took place, including the condyloid and coronoid processes. Separation finally occurred near the symphysis; and when I was first called, some seven months after, nature was making an effort to throw it off. This was done by the gradual replacing of a hard substance having the external feel of bone, which, as it increased in size and hardness, had evidently pressed the necroid portion of bone out so that, at the time I saw the case first, the anterior extremity of the detached bone was so raised as to keep the mouth quite wide open. The necrosed bone was quite movable, and on instituting motion, a considerable quantity of purulent matter was discharged from the soft parts surrounding the bone.

In consequence of the elevated position of the anterior extremity of the dead bone separating the jaws, the patient had been unable to masticate her food for nearly three months. On attempting the removal of the detached bone, not the least difficulty was encountered, nature having already almost accomplished the work. An incision about one inch long was made on the upper side, and the bone readily seized and extracted with the forceps. As soon as the dead bone was removed, the motion of the lower jaw was measurably restored; and on opening and closing the mouth quickly, the motion of the coronoid process under the zygomatic arch could be as distinctly felt as in the natural condition.

The reproduced bone (as it was evidently nothing else) was much larger than the natural bone, and on the under side very convex. She remained under my treatment for two months, during which time the reproduced bone constantly improved in its shape, which I afterwards ascertained continued until nearly all deformity was removed.

CORRESPONDENCE.

THE Secretary of the College of Dentists presents his compliments to the Editor of the DENTAL REVIEW, and will thank him to publish the accompanying correspondence in his next impression.

5 Cavendish square, March 25th, 1861.

College of Dentists of England,
5 Cavendish square, London, W.
February 13th, 1861.

SIR,—The Leading Article of the 'British Journal of Dental Science' for the past month has been brought under the notice of the Council of this College. As the general tenor of the article is of a nature calculated to throw discredit upon the College, by means of unfounded assertions with reference to the status of the members, I am instructed to request that you will answer the following questions —viz.:

1. Do you mean to imply that the College of Dentists consists, with two or three exceptions, of blacksmiths, barbers, &c.?
2. If so, who are the persons alluded to as being blacksmiths and the like?
3. Upon what authority do you state that the members of the College generally consist of a few *ci-devant* workmen, unworthy the name of Professional men, and their pupils and assistants?

The Council deem it their duty to demand that this letter be inserted in your next impression, together with replies to the questions it contains.

I am, Sir, your obedient servant,
SAMUEL LEE RYMER, Hon. Sec.

To the Editor of the
'British Journal of Dental Science.'

Monday, February 25th, 1861.

The Editor of the 'British Journal of Dental Science' presents his compliments to Mr Rymer, and has to acknowledge the receipt of his letter of the 13th inst., which he begs to state (as will be shown by the accompanying correspondence* between the publisher and himself respecting it) reached him only on the afternoon of February 22nd inst. The Editor refers Mr Rymer to his leader of this month, published (in consequence of this accidental delay) *before* he had received Mr Rymer's letter, as constituting an answer to the inquiries therein, and showing that those inquiries rest upon an entire misapprehension of the leader referred to.

The Editor concludes that it will not now be the wish of the Council of the College of Dentists that Mr Rymer's letter, and his answer, should appear in his Journal; but, if such should be still the wish of the Council of the College of Dentists, he can have no objection to their insertion.

To Samuel Lee Rymer, Esq.

The Editor of 'the British Journal of Dental Science' presents his compliments to Mr Churchill, and begs to inform him that he has this day received from his office a letter from Mr Samuel Lee Rymer, addressed "To the Editor of the 'British Journal of Dental Science,' 11 New Burlington street," bearing date February 13th.

The Editor would feel much obliged if Mr Churchill would inform him how so great a delay has occurred between the receipt of the letter at the office and its transmission to the Editor.

The post-mark on the envelope of Mr Rymer's letter bears the date February 14th.

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11 New Burlington street, London, W.
25 February, 1861.

DEAR SIR,—I regret if at any time irregularity should occur in my publishing office.

I have made minute inquiries as to the delivery of the letter you refer to, and my young men cannot fix the particular date of its transmission to you. I fear, however, that some neglect has occurred in this instance, and I have given instructions as to the importance of early and exact attention to this duty. I trust no similar cause of neglect will occur.

I am yours faithfully,
JOHN CHURCHILL.

To the Editor of the
'British Journal of Dental Science.'

(* Correspondence referred to.)

North End, Croydon, S.

SIR,—I beg to acknowledge the receipt of your note of the 25th instant, which I will lay before the Council of the College of Dentists.

I remain, Sir, yours faithfully,
SAMUEL LEE RYMER,
Hon. Sec. College of Dentists.

To the Editor of the
'British Journal of Dental Science.'

College of Dentists of England,
5 Cavendish square, London, W.
March 7th, 1861.

SIR,—Your note of the 25th ultimo has been laid before the Council, and I am instructed to inform you that they cannot regard the article to which you refer as an answer to my letter. Under the circumstances, the Council feel it their duty to request the insertion of the correspondence in the next number of your Journal.

I remain, Sir, your obedient servant,
SAMUEL LEE RYMER, Hon. Sec.

To the Editor of the
'British Journal of Dental Science.'

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11 New Burlington street.

The Editor of the 'British Journal of Dental Science' begs to acknowledge the receipt of Mr Rymer's note of the 7th instant, and will have much pleasure in publishing the correspondence as requested.

March 8th, 1861.
To Samuel Lee Rymer, Esq.

TO THE EDITOR OF THE 'DENTAL REVIEW.'

SIR,—The Editor of the 'British Journal of Dental Science' has wisely occupied five pages of that periodical for the present month with a review which appeared in the 'Athenæum' two weeks ago, upon the 'Essays and Observations on Natural History,' by John Hunter, edited by Owen. The Editor has, however, thought it necessary to omit one of those short but piquant observations which occasionally fall from the pen of Professor Owen. After the quotation describing the feelings which were excited in the minds of Hunter's contemporaries by his daring conclusions in geology, and ending "in the Society expressly founded for the promotion of natural knowledge," the Reviewer in the 'Athenæum' goes on to say,—

"After having refused Professor Owen permission to publish this paper, the College of Surgeons brought it out last year; but the Professor observes that, '*with characteristic stupidity and indifference to accuracy*,' it is stated that the number of Hunterian fossils is 415, instead of 2,773."

The passage now quoted completes the review as it appeared in the 'Athenæum;' and I hope you will give it insertion, in order that those who may chance to read both Dental journals may have the benefit of this quiet but very hard rub at the Council of the College of Surgeons. I can well understand that this in a point upon which the Editor of the 'British Journal' would be rather sensitive, and, like a dutiful offspring, would be quite ready to conceal any other blunders committed by the manufacturers of the Dental Certificate.

Yours obediently, A CONSTANT READER.

TO THE EDITOR OF THE 'DENTAL REVIEW.'

SIR,—As it would seem than the Editor of the 'British Journal of Dental Science' delights to abuse the College of Dentists and its members month after month, and to make general charges which he cannot prove when called upon to do so—although he may give explanations in which prevarication vies with effrontery—will you allow me to suggest to the Council of the College of Dentists, that they try the question, whether repeated false statements published with the avowed object of injuring the College will receive "legal recognition" (a favourite term of your contemporary? I am assured by some legal friends whose opinion can be relied upon, that several recent articles in the Journal referred to are libellous beyond a doubt.

Should this suggestion be acted upon, I believe much good would result, as the whole question of Professional reform could be displayed in a clear light by Counsel, and it would then be seen whether the College or its opponents are in the right.

Your obedient servant,

A COUNTRY M.C.D.E.

MISCELLANEOUS.

METROPOLITAN SCHOOL OF DENTAL SCIENCE.—We are requested to state that a class has been formed for the study of Practical Chemistry in connection with the Metropolitan School of Dental Science. This class will be under the superintendence of Dr Bernays, and will meet once a week during the months of May, June, and July. Students desirous of joining the class should apply to Mr Kempton, the Hon. Secretary to the School.

APPOINTMENT.—A Special Meeting of the Governors of the Essex and Colchester Hospital was held on the 7th ultimo, for the purpose of electing a Dentist to the institution, agreeably to a resolution passed at the last half-yearly meeting. J. Bawtree, Esq., occupied the chair, and Mr Robert Tweed, M.C.D.E., of Colchester, was unanimously elected to fill the office of Dentist; the Chairman congratulating Mr Tweed upon his election, and expressing a hope that the appointment would be the means of raising him to a still higher position of eminence and success in the Profession to which he had so zealously devoted his time, attention, and talents. Mr Tweed suitably acknowledged the honour conferred upon him, and the Meeting separated after the usual compliment to the Chairman.

'REVUE ODONTOTECHNIQUE.'—Our excellent contemporary the 'Revue Odontotechnique' has recently changed hands, and is now under the management of T. R. Hammond, of New York. In the January number, the Editor promises his readers that the journal shall be neither exclusively French nor American, but cosmopolitan, acting upon the principle that the arts and sciences belong to no individual country, but to the world at large. One novelty in the present arrangement is to give a translation of the late Dr Harris's well-known work on 'Dental Surgery,'—a design which cannot be otherwise than acceptable to the subscribers of the journal. Is it not, however, an oversight by which the translation is said to be from the sixth edition, when we find that in the preface to the seventh edition, which we have before us, Dr Harris says, "nearly every page has been carefully revised, and additions have been introduced throughout the entire work: three new chapters and a number of illustrative cuts have also been added"? The Editor states, that notwithstanding the failure of the attempt to form a Dental College in France, he still continues to receive letters in favour of such an institution. He promises that the pages of his journal shall always be ready to support the formation of a College, but he justly remarks that the initiative must be taken by the Dentists themselves. We can only wish Mr Hammond that success which the spirited manner in which he has commenced his editorial duties appear to warrant us in anticipating.

Nitric Acid Stains.—The 'Rep. de Chimie' contains the following, on the removal of nitric acid stains from the skin: "We know that nitric acid stains the skin yellow, and that it is impossible to remove the discolouration by ordinary reagents. We know, also, that these stains disappear only when the epidermis is renewed. M. Schwarz advises for their removal the use of sulphide of ammonium, with the addition of a little caustic potash. By this means the colouring matter is not destroyed, but the burnt epidermis is converted into a soapy substance, which can be scratched off with a small piece of wood, the nail, or rubbed off with sand. By washing with a little dilute sulphuric acid, the skin becomes clean and recovers its natural whiteness. M. Schwarz believes that in some cases the above combination might be used as a caustic, and that its application might prove serviceable in certain affections of the skin."—'Chemical News.'

Shipment of Gas from America to London.—We saw yesterday, at the passenger station of the Pennsylvania Railroad, at Eleventh and Market street, a number of wrought-iron cylindrical vessels, which, we were informed, contained compressed gas. Upon further inquiry, we learned that Mr Williams, who had fitted up the cars on the Pennsylvania Central Railroad for burning gas, had also taken a contraet from Hathaway and Leach, of this city, for fitting out a number of cars to be used on the street railways in London. These cylinders had been sent to the railroad workshops in Altoona, to be filled with gas by means of the Company's apparatus there; so that, before long, we may expect to hear of American street railway cars in London, lighted with gas made at the foot of the Alleghany mountains.—'Chemical News,' from 'Philadelphia Gazette.'

NOTICES TO READERS AND CORRESPONDENTS.

NOTICE.—This Journal is now published by Mr John W. Davies, 54 Princes street, Leicester square, W., to whom all Communications intended for insertion, as well as Books for Review, &c., should be addressed to "The Editor," NOT LATER THAN THE 15TH OF THE CURRENT MONTH.

⁂ The continuation of 'Hunter on the Teeth' is unavoidably postponed till next month.

All communications intended for insertion in this Journal must be authenticated by the name and address of the writer, not necessarily for publication, but as a guarantee of good faith.

Contributors are requested to be so obliging as to write legibly, and on one side of the paper only.

BOOKS RECEIVED IN EXCHANGE.

The Dental Cosmos for March.
The London Medical Review for March.
Revue Odontotechnique for January.

THE

DENTAL REVIEW.

MAY, 1861.

THE NATURAL HISTORY OF THE HUMAN TEETH.

BY JOHN HUNTER, F.R.S.

EDITED BY

FRANCIS C. WEBB, M.D. Edin., F.L.S., F.S.A.,
Member of the Royal College of Physicians of London; Physician to the Great Northern Hospital, &c.

(Continued from page 101.)

OF THE STRUCTURE OF A TOOTH. (*k*) AND, FIRST, OF THE ENAMEL.

A Tooth is composed of two substances, viz. Enamel and Bone. (*l*) The Enamel, called likewise the vitreous, or cortical

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(*k*) [For Engravings illustrative of the microscopic structure of the dental tissues, *vide* Plates 4 and 5.]

(*l*) [It may be stated, in general terms, that a tooth is a hard body primarily distinct from the skeleton, situated in the mouth or at the commencement of the alimentary canal, composed of organic and inorganic matter, and enclosing a vascular pulp which occupies a cavity in its interior. In examining the teeth of the greater number of vertebrate animals, we are able to discriminate two or more tissues, of differing structure and hardness. The principal dental tissues are the *dentine* or *ivory* (bone of the text), the *enamel*, and the *cement* or *crusta petrosa.* Of these, the dentine forms the chief mass of the body of the tooth, the cement the outer crust, whilst the enamel, where it exists, is external to the dentine, or between it and the cement. Besides the three principal dental tissues, various modifications of the dentine not unfrequently occur, to which names have been applied indicative of their structural peculiarities—*e.g.*, *osteo-dentine*, *vaso-dentine*. Although structures analogous to dental organs are met with in the invertebrate classes, it is amongst the vertebrata alone that true calcined teeth are found. In the teeth of vertebrate animals, the number of component tissues, and the manner of their arrangement, exhibit considerable variation. Amongst the class *Pisces*, there are a few instances (*e.g.*, the Wrasse *Labrus*) in part, is found only upon the body of the Tooth, and is there

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which the teeth consist of but one tissue, which is always a modification of dentine. It is more common, in the same class, to find the tooth composed of ordinary dentine, and of the same structure, permeated by vascular canals (vaso-dentine): in such instances, the hard unvascular dentine is external, and supplies the place of the enamel of higher animals. The molars of the Dugong afford examples of teeth composed of dentine and cement alone, the latter forming a thick crust on the surface of the former. At first sight, the human teeth and those of Carnivora might be supposed to consist of but two tissues—dentine and enamel. This is the statement of the text, and until a comparatively late period it passed as an acknowledged fact. It was on account of this apparent simplicity of structure that these teeth were distinguished as "simple" by the Cuviers. More recent observation, however, has shown that, besides the enamel and dentine, the third principal dental tissue—the cement—forms a component part of the human and the other so-called simple teeth. The teeth of Mammalia, which received from Cuvier the name of "Compound" or "Complex," differ from those of Man and the Carnivora only in a different proportion and disposition of the same constituent tissues. In some instances—*e.g.*, the molars of the Elephant, the molars of the African Wart-hog (*Phacochærus*), the pectinated incisors of the Flying Lemur (*Galeopithecus*)—a tooth of a high degree of complexity is produced by the aggregation of distinct denticles. The great grinding tooth of the Elephant is composed of a series of denticles, each having the form of a plate, vertical to the grinding surface, and transverse to the long diameter of the tooth. Each plate consists of dentine coated by an investment of enamel, whilst the interspaces between the denticles are completely filled by cement. In the fully-formed tooth, the bases of the several divisions of the crown become fused into a common body of dentine; but at an earlier period, before the calcification of the plates is complete, they are held together by the cement alone. The incisors of Galeopithecus, on the other hand, differ from the tooth just described in the circumstance that the denticles project as distinct processes from the base of the crown: each consists of dentine with a covering of enamel, which is again coated with a layer of cement of extreme thinness; at the base the denticles are united, and into each a prolongation is continued from the common pulp cavity. But a high degree of complexity of dental structure is not restricted to Mammalia. In the grinding apparatus of the Parrot-fishes (*Scarus*), for instance, which "browse upon the lithophytes that clothe as with a richly-tinted carpet the bottom of the sea, just as the Ruminant Quadrupeds crop the herbage of the dry land," (1) dental masses, bearing a close analogy to the complex molars of the Elephant, are formed by an aggregation of denticles. Moreover, each denticle of the Parrot-fish consists of dentine with a thick covering of enamel: the denticles are united together by a partial filling of their interspaces by cement, whilst a fourth substance is added, in the form of a vascular osteo-dentine, which, produced by the ossification of the base of the pulp, serves to unite the denticles with each other, and with the subjacent pharyngeal bone. The tooth, thus composed of four substances, exhibits the highest degree laid all around, on the outside of the bony, or internal substance.

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(1) Owen, Art. Teeth, Todd's Cyclop. Anat. and Phys.

of complexity yet observed in the animal kingdom. Many other variations in the structure of the teeth, and in the arrangement of the dental tissues, are to be found amongst vertebrate animals; but sufficient examples for the purpose of illustration have been adduced. (1)

In the human tooth, the dentine forms the principal mass both of the fang and crown: in the latter situation it is covered by enamel, in the former by cement. (*Vide* Plates 4 and 5.) As no separate mention is made of this last-named substance in the text, it will be, perhaps, convenient to describe its disposition and structure in the human tooth before commencing our commentary on the enamel.

The *Cement*, *Crusta Petrosa*, *Substantia Ostoidea*, is a layer of true bone which in Man covers the fang or fangs of the tooth. In some instances it appears to commence where the enamel ceases, but in many others it manifestly overlaps the enamel for a short distance from its edge. The layer of cement is extremely thin at the neck of the tooth; but, in tracing it down the fang, it is found to become thicker as it descends, until it attains its maximum of depth at the apex. That confluent condition of the fangs which is so common in certain of the molar teeth amongst the leucous and xanthous varieties of Man, is produced by the cement which fills the interspaces, just as in the compound molar of the Elephant it unites a series of denticles into a single mass. It is, of course, found of considerable thickness along the sulci which indicate the division of fangs so conjoined. According to some of the best observers, a thin layer of cement may be traced in the unworn tooth covering the enamelled crown. In a paper read before the Medico-Chirurgical Society in 1839, Mr Nasmyth announced the discovery of a membrane separable by the action of dilute hydrochloric acid from the surface of the enamel, which, he expressly states, is continuous with the cement, and which, he believed, was at least analogous to, if not identical with, a layer of that substance in a rudimentary condition: this layer he terms the *persistent capsular investment*. (2) Nasmyth's observation was confirmed by Professor Owen, who, in writing of the so-called simple teeth, says, "their crowns are originally and their fangs are always covered by a thin coat of cement." (3) Other observers, amongst whom are Huxley and Kölliker, although allowing the existence of a thin calcified pellicle (by the former named '*Nasmyth's membrane*,' by the latter the '*cuticle of the enamel*') on the surface of the enamel, do not recognise in it a prolongation of the cement. It would appear that the layer in question is remarkable for its great capability of resisting chemical reagents; it differs in this respect from ordinary cement, and is proportionately better fitted to protect the crown of the tooth. The original surmise of Nasmyth has, however, received some confirmation from some observations recorded by Mr Tomes in his 'System of Dental Surgery.' This gentleman, in describing the disposition of the cement, writes: "In a few rare instances it may be traced, not only over the terminal edge of the enamel, but for some little distance upon the coronal portion

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(1) Owen, op. cit., Odontography.

(2) Med.-Chir. Trans., vol. xxii., pp. 314, 315. Researches on the Development, Structure, and Diseases of the Teeth, by Alex. Nasmyth, p. 79; 1849.

(3) Article Teeth, Todd's Cyclop., p. 867.

It is by far the hardest part of our body; insomuch that the

of the tooth; and specimens are now and then found in which it fills up the deep fissures situated between the tubercles of the molar teeth." Again, in reference to Nasmyth's membrane, he says: "In several specimens which have been decalcified after being reduced sufficiently thin for microscopic examination, this membrane is obviously continuous with the cementum of the fang; and in other specimens which have not been treated with acid, I find the membrane thickened in the deep depressions of the crowns of molar teeth, and there tenanted by a distinct lacuna." (1)

As life advances, the cement increases in thickness, especially towards the apex of the fang. In those cases in which its formation extends beyond a certain limit, it constitutes the disease known as "dental exostosis." The inner surface of the cement is so intimately connected with the dentine, that under a high degree of magnifying power its boundary line is not very sharply defined. Its external surface, which is uneven and not unfrequently marked with circular striæ, is in close contact with the alveolar periosteum and the gum; but it is more firmly united with the former than with the latter. Its tissue is less hard than either dentine or enamel: consequently, its surface when exposed to attrition becomes worn down at an earlier period, as may be seen in the complex grinders of the Elephant, the Masked Boar, or Capybara. In chemical composition the cement is almost identical with bone. The following is its analysis according to Bibra: (2)

	In Man.	In the Ox.
Organic substance	29·42	32·24
Inorganic substance	70·58	67·76
	100·00	100·00

In the Ox the proportions of the several ingredients were—

Phosphate of Lime and Fluoride of Calcium	58·73
Carbonate of Lime	7·22
Phosphate of Magnesia	0·99
Salts	0·82
Cartilage	31·31
Fat	0·93
	100·00

The cement may be readily deprived of its earthy salts by the action of acids. The organic residue yields ordinary gelatine on boiling.

Cement, we have already said, is a layer of true bone, with but little modification. But it is only in situations in which it attains great thickness (*e.g.*, the teeth of the Horse, Sloth, Ruminants), that it exhibits canals for the passage of vessels (Haversian canals). In the human tooth the existence of Haversian canals is to be considered exceptional, although they are occasionally to be met with in situations where the cement is of unusual thickness. When, for instance, the fangs of a molar are united by cement, a vascular canal is not unfrequently found

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(1) Tomes, 'A System of Dental Surgery,' pp. 257, 271; 1859.

(2) Manual of Human Microscopic Anatomy, by A. Kölliker, p. 297; 1860.

hardest and sharpest saw will scarce make an impression upon

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traversing the medium of union (Tomes.) Their existence, therefore, in the human tooth is not to be regarded as necessarily an indication of morbid action, although they are most frequently to be noticed in the thickened cement of old teeth and in cases of dental exostosis. When present, they penetrate from without; in some instances they branch once or twice, and anastomose, or end by blind extremities, or a canal may end by a dilatation, "as though occupied by a vessel that had turned upon itself and gone out by the same channel through which it entered." (1) Their diameter is too narrow (0·003‴ to 0·01‴, Kölliker) to admit the presence of marrow as well as of blood-vessels. As in bone, the vascular canal in cement is surrounded by concentric laminæ.

Cement, like other osseous tissues, is composed of a matrix, in which are imbedded more or less numerous microscopic cells (*corpuscles* or *lacunæ*), from which proceed, in various directions, fine, delicate ray-like canals (*canaliculi*), which by anastomosing constitute a system of tubes for the convection of nutrient fluid through the tissue. The *matrix* or *basal substance* usually appears to consist of lamellæ, concentrically placed, the centre of the tooth being the common centre. According to Kölliker, the basal substance is sometimes granular, sometimes striated in the transverse direction, sometimes more amorphous, frequently lamellated. Mr Tomes describes it as granular, and likens it to a mass of coherent fig-seeds or to oolite. The cells or *lacunæ* are scattered through the matrix with some degree of regularity, being frequently, although not always, disposed in series; or they appear as if placed between concentric laminæ. They are always absent where the cement is thinnest, near the neck of the tooth; they generally appear about the middle of the fang, and increase in number with the thickness of the cement, towards the apex, where they often present the serial appearance to which we have just referred. They possess the essential characters of the lacunæ of bone. They appear dark by transmitted, and white by reflected light; a circumstance due simply to their being filled with air. In the lacunæ of fresh osseous tissue, a delicate-walled cell, containing a clear fluid and a single nucleus, has been discovered by Virchow. From this included cell, numerous processes are sent into the canaliculi which branch out on every side from the lacuna. These processes anastomose with like processes from the included cells of neighbouring lacunæ. In shape the lacuna is generally oval, but occasionally round or fusiform; in fact, in this respect they are subject to great variety. Equally variable is their size; according to Kölliker, 0·005‴ to 0·02‴, even to 0·03‴, in diameter. In the thick layers of cement which are found on old teeth, these recesses are generally of an elongated form and very irregular. Some lacunæ, either separately or in groups, may be seen to be surrounded by a tissue of more than the ordinary transparency. This clearer substance is well defined by a slightly-waved border, which Kölliker supposes may be in some way related to the cell from which the lacuna is formed. The *canaliculi* which are given off by the lacunæ of cement are of unusual number and length. They are frequently so numerous as to give the idea of a it, and we are obliged to use a file in dividing or cutting it. (*m*) When it is broken it appears fibrous or striated; and all the fibres or striæ are directed from the circumference to the center of the Tooth.

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(1) Tomes, Lectures on Dental Physiology and Surgery, p. 58; 1848.

This, in some measure, both prevents it from breaking in mastication, as the fibres are disposed in arches, and keeps the Tooth from wearing down, as the ends of the fibres are always acting on the food. (*n*)

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pencil or plume of processes, which again branch into still finer rays. The majority of the canaliculi are directed outwards towards the surface of the tooth, or inwards towards the dentine: some, however, follow the course of the length of the tooth; or, where a vascular canal is present, they take a direction towards its surface. In crossing the matrix, they give it a finely-striated appearance; they anastomose freely with the canaliculi of neighbouring lacunæ, and near the surface of the dentine they may be seen to inosculate with the terminations of the dentinal tubes. Other cavities may be observed in cement; some of them are of a pathological nature. But, besides these, Mr Tomes notices tubes of occasional occurrence which pass across the cement towards the surface of the tooth. They equal in size the dentinal tubes, but have fewer branches. Occasionally the canaliculi enter them. Kölliker, in referring to what appear to be the same tubuli, says that their branches are frequently connected with the terminations of the dentinal canals, and with the canaliculi. On the fangs of deciduous teeth the cement is thin, and exhibits comparatively few lacunæ.] (1)

(*m*) [Such is the hardness of the enamel, that it emits sparks when struck with steel. (2) It is also more brittle than the cement and dentine. We have already referred to the worn surface of the Elephant's molar, as well exemplifying the relative density of the dental tissues. It presents a series of transverse cylindrical ridges of enamel, each enclosing a depressed surface of dentine, whilst the plates so formed are separated from each other by still more deeply depressed valleys of cement.]

(*n*) [The external surface of the enamel appears smooth, but almost always presents, on careful examination, delicate, closely-approximated transverse ridges, and in some instances annular elevations. We have already adverted to the fact that it is covered by a delicate calcified pellicle (Nasmyth's membrane, cuticle of the enamel). According to Kölliker, "Nasmyth's membrane" is a calcified structureless membrane, 0·0004‴ to 0·0008‴ in thickness, which on its internal surface is furnished with depressions for the reception of the extremities of the enamel fibres. Its connection with the enamel is so intimate, that it can only be demonstrated by the employment of hydrochloric acid. Professor Huxley believes that the membrane in question is the altered *membrana preformativa* of the dental pulp. To this subject we shall

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(1) Kölliker, Tomes, Owen, op. cit.
(2) Nasmyth's Researches, p. 81.

The Enamel is thickest on the grinding surface, and on the cutting edges, or points, of the Teeth; and becomes gradually

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have, however, to recur, when stating the various opinions current on the subject of the development of the dental tissues.

In very thin sections, enamel is translucent and of a bluish colour. Its substance is generally allowed to be composed of the so-called enamel fibres (enamel-prisms, enamel-needles)—hard, dense, microscopic structures, consisting almost entirely of earthy matter. These fibres were described by Retzius as being solid hexagonal prisms. They are not, however, regular in outline. Mr Tomes observes, that in a transverse section he has as frequently found them approach a square or an irregular circle as any other form. They are long, extending for the most part throughout the thickness of the enamel, the inner end resting on the dentine, the outer being in contact with Nasmyth's membrane. The position of the enamel fibres being generally vertical to the surface of dentine on which they rest, it follows that their direction will be horizontal on the sides of the tooth, vertical on the summit of the crown. Fibres occupying all the intermediate positions between the vertical and horizontal will be seen in examining the enamel as it passes from the grinding or cutting surface downwards to the side of the tooth. We have said that the fibres, for the most part, extend throughout the entire breadth of the enamel, and this is undoubtedly true of the greater number; but, as the surface of the dentine is more or less conical, and no separation of the fibres takes place as they proceed outwards, neither has any increase in their thickness been observed, we cannot doubt the existence of shorter supplemental fibres, which fill up the intervals that otherwise would necessarily occur. Such supplemental fibres, however, are not easily demonstrated, owing to the waved course of the fibres, and the consequent difficulty in tracing a series of them throughout their entire length. It is almost impossible to isolate for any distance the enamel fibres in the adult tooth, although they can be readily seen in transverse and longitudinal sections: it may, however, be more readily accomplished in the softer enamel of young or developing teeth. The breadth of the enamel fibre is, according to Kölliker, 0·0015‴ to 0·0022‴. Isolated prisms obtained from young enamel are seen, especially after treatment with dilute hydrochloric acid, to have a slightly varicose outline, and to be marked with transverse lines, or striæ, which occur at tolerably regular intervals, and produce an appearance similar to that of a "colossal muscular fibrilla." (1) This striated aspect led Mr Nasmyth to the opinion that enamel consisted of "nothing more than a mass of cells arranged in rows, and fitted closely together, but held only slightly in contact by a thin web of membrane." (2) Retzius and others have also believed the transverse marks to be the indications of pre-existing walls of coalesced cells. Kölliker, on the other hand, maintains that they "are the expression of the growth of the fibres through apposition, or are *not* the expression of their composition of cellules." (3) Mr Tomes observes that the transverse striæ are much more strongly marked in some specimens than in others, and that they are most evident in thinner on the sides, as it approaches the neck, where it terminates insensibly, though not equally low, on all sides of the

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(1) Kölliker, op. cit., p. 295.
(2) Nasmyth, op. cit., p. 83.
(3) Kölliker, op. et loc. cit.

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those portions of enamel which, when seen by transmitted light, are of a brown colour. This condition will sometimes be found in certain unhealthy subjects to pervade the entire enamel. In such cases he has found the markedly striated appearance to result from the occurrence, at regular intervals, of minute granular masses in the central portion of the enamel fibres. These masses are comparatively opaque, and the alternation of opaque and transparent parts gives the appearance of striation. This appearance is rendered more distinct by the use of dilute hydrochloric acid, which has the effect of removing the granular masses from that portion of the tissue with which it comes more directly in contact, whilst in deeper parts the opaque masses become more distinct in consequence of the removal of all opacity from the superficial portion. A transverse section thus treated with dilute hydrochloric acid has the appearance of a portion of honeycomb from which the honey has been removed. As the result of his observations, Mr Tomes does not admit that the structure of fully-formed enamel is in the strict sense of the term "fibrous." "A honeycomb," says this observer, "if the cells were filled with a material of greater opacity or density than the wax of which the cells themselves are formed, would not be regarded as fibrous; yet the arrangement of the parts would resemble those of the enamel." To the argument that the cleavage of the enamel demonstrates its fibrous nature, he replies that the lines of fracture do not run in the longitudinal interspaces between the fibres, but through the lines of granular masses. He, however, allows that in the young tooth, during the process of formation, the fibrous arrangement is sufficiently distinct, and may be demonstrated by hydrochloric acid. In the most perfectly-developed enamel, he finds the sheaths of the fibres completely blended; the longitudinal and transverse markings are comparatively faint, and appear under a high magnifying power, with a good light, not as dark, but as light lines, enclosing spaces occupied by a more dense and opaque material. He describes several imperfect forms of development in this tissue, all of which are to be regarded as predisposing causes of caries: the fibrous condition may be maintained in consequence of the imperfect blending or fusion of the sheaths of the fibres; or the central portion or contents of the fibre may be imperfectly developed, remaining in the condition of fine globular masses or granules; or fine cavities arranged in single lines may occupy the centre of the fibre—in some cases these may coalesce, and convert the fibre into a tube; or, lastly, both longitudinal and transverse markings may be replaced by a general granular condition of the tissue. (1)

There can be no doubt that the conjunction of the enamel fibres is very intimate. Neither intermediate substance nor regular canals have been demonstrated between them. Cavities, however, frequently exist in enamel, and they are referrible either to extension of the dentinal tubes and of elongated cavities produced by the enlargement of the dentinal tubes into the enamel, or to irregular fissures in the outer and middle parts of that tissue. These latter are frequently found leading down from the depressions between the cusps of the molar and premolar

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(1) Tomes, System of Dental Surgery, p. 258—277.

Teeth. (*o*) On the base or grinding surface it is of a pretty equal thickness, and therefore is of the same form with the bony substance which it covers.

It would seem to be an earth united with a portion of animal substance, as it is not reducible to quick lime by fire, till it has first been dissolved in an acid. When a Tooth is put into a weak acid, the Enamel, to appearance, is not hurt; but on touching it with the fingers, it crumbles down into a white pulp. The Enamel of Teeth, exposed to any degree of heat, does not turn to lime: it contains animal mucilaginous matter; for when exposed to the fire, it becomes very brittle, cracks, grows black, and separates from the inclosed bony part of the Tooth. (*p*) It is capable, however, of bearing a greater degree of heat than the bony part, without becoming brittle and black.* This substance

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* From this circumstance we can shew the Enamel better by burning a Tooth, as the bony part becomes black sooner than the Enamel. The method of burning, and shewing them after they are burnt, is as follows.—Let one half of a Tooth be filed away, from one end to the other, then burn it gently in the fire; after this is done, wash the filed surface with an acid, or scrape it with a knife. By this method you will clean the edge of the Enamel, which will remain white, and the bony part will be found black.

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teeth, and are to be placed in the foremost rank amongst the predisposing causes of caries.

Like the tubes of dentine, the course of the enamel fibres is not straight. On the contrary, they are slightly and irregularly waved. On the summit of the crown they present two or three larger waves. Decussations of layers of the enamel prisms take place in transverse planes of the tooth. Hence it is that, on the addition of hydrochloric acid, a longitudinal section will have a striated appearance, the prisms cut transversely will appear darker than those which present their longitudinal aspect. Layers of the enamel fibres may be seen on the summit of the crown to run in an annular form, describing circles on the molar, ellipses on the cutting teeth. Besides the striated appearance indicating the stratified arrangement of the fibres, Kölliker describes certain brownish or colourless lines crossing the enamel fibres in different directions, which in perpendicular sections are seen as obliquely ascending lines or arches, but in transverse sections as circles in the outer layers of the tissue, rarely occurring throughout its entire substance. He regards them as "the expression of the lamellated mode of formation of the enamel."] (1)

(*o*) [The enamel extends lower upon the inner and outer than upon the opposed surfaces of the crowns.]

(*p*) [Enamel in chemical composition differs from the other tissues of the tooth in the exceedingly small proportion of animal matter which has no marks of being vascular, and of having a circulation of fluids: the most subtile injections we can make never reach it; it takes no tinge from feeding with madder, even in the youngest animals; and, as was observed above, when soaked in a gentle acid, there appears no *gristly* or *fleshy* part, with which the earthy part had been incorporated.*

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(1) Kölliker, op. cit., pp. 296, 297.

We shall speak of the use and formation of the Enamel hereafter, when they will be better understood.

(To be continued.)

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* In all these experiments I never could observe, that the Enamel was in the least tinged, either in the growing or formed Tooth. This looks as if the Enamel were the earth more fully depurated, or strained off from the common juices in such a manner, as not to allow the gross particles of madder to pass. Here it may not be amiss to remark, that the names given to animal substance, such as Gluten, &c. are not in the least expressive of the thing meant; for there is no such thing as glue in an animal, till it has either undergone a putrefactive process, or been changed by heat. And here too I would be understood, that I call earth no part of an animal; nor does it make up any part of an animal substance.

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it contains. The organic matter differs from gelatine, and is in every respect analogous to the substance of the epithelium. The following is Bibra's analysis: (1)

	Molar Tooth in an Adult Man.
Phosphate of Lime, with some Chloride of Calcium	89·82
Carbonate of Lime	4·37
Phosphate of Magnesia	1·34
Salts	0·88
Organic substance	3·39
Fat	0·20
	100·00
Organic substance	3·59
Inorganic parts	96·41]

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(1) Kölliker, op. cit., p. 295.

ORIGINAL COMMUNICATIONS.

DISEASES OF THE DENTAL PERIOSTEUM:

A COURSE OF LECTURES DELIVERED AT THE COLLEGE OF DENTISTS OF ENGLAND, SESSION 1860-61,

BY R. T. HULME, M.R.C.S., F.L.S.

MR PRESIDENT AND GENTLEMEN, — The last time I had the honour of addressing you, I could venture to do so with greater confidence than I can on the present occasion. The subject I had then to treat of was one which passed out of the ordinary routine of Dental practice into the more excursive and untrodden paths of Comparative and Developmental Anatomy. On the contrary, the diseases of the dental periosteum, of which I have now to speak, must have come constantly under the notice of those present, many of whom have had more extended opportunities of tracing these forms of dental disease than I can lay claim to. When, therefore, in compliance with the request of the Council, I consented to deliver three lectures on some subject connected with Dental pathology, I had no expectation that I could afford you any very novel information; neither could I hope to claim your attention by placing before you the attractive results of new discoveries in so familiar and well-explored a department of Dental practice. Under these circumstances, I feel I must trust to the good-will of my audience rather than to my own abilities for their patient acceptance of these lectures. All I can hope to accomplish is to place before you a full and systematic account of the various affections to which the dental periosteum is liable. In this manner I may pave the way for the better discussion of the subject at some of our future meetings, and provide those who may be desirous of investigating this department of Dental pathology with a knowledge of what has been done by previous inquirers, and thus put them in possession of the present condition of the subject.

I do not know that I can enter upon these lectures more appropriately than by first considering what are the physiological conditions of the organs with which we have to deal, and by comparing them with those of the other bones of the body. The ordinary bones of the skeleton are always invested on their external surface with a tough fibrous membrane, termed the periosteum. This membrane receives a plentiful supply of blood-vessels and nerves, which pass to the interior of the bone, and the periosteum thus becomes the source from whence the denser external layer of the bone is supplied with blood. The cylindrical cavity of the long bones is filled with the fatty albuminous material known as the medulla: through a special canal, an artery termed the medullary passes to supply the inner cancellous structure of the bone with its nutrient fluid. The cavity of the bone, as well as the cancellous structure, is invested by an extremely delicate membrane, which answers to the external periosteum, and, like that, serves as a medium upon which the medullary artery subdivides before its terminal branches enter the substance of cancellous structure. This inner lining membrane differs from the external periosteum by its extreme delicacy, and in the impossibility which exists of removing it in the form of a continuous membrane from the surface of the bone.

The usual division of a tooth into its crown and fang is justified not only by the relation which these parts bear to the surrounding structures, but also by the difference in the histological elements which enter into their formation. If a tooth is divided at the junction of the crown with the fang, and the two portions are compared with one of the cylindrical bones, in the first portion or crown of the tooth there is only a resemblance of analogy, while in the second there is a partial histological identity, or, in some respects, the one is homologous of the other. Thus, a section of a cylindrical bone exhibits a central mass of medulla, surrounded by a ring of cancellous bone: around this is the dense, compact external layer, and most externally of all is the periosteum. In the same way, a section of the crown of the tooth consists of the central mass of the tooth-pulp, surrounded by the dentine; while around this is the enamel, which is itself invested by Nasmyth's persistent membrane. None of these parts, however, possess the same structural elements as the corresponding parts of the bone. In the fang of the tooth, the parts remain the same as regards the pulp and the surrounding dentine. So far, therefore, there is the same distinction between the fang of the tooth and a cylindrical bone as in the crown. When, however, we consider the external covering of the fang, this is no longer the case: instead of a layer of hard, low-organised enamel, its place is occupied by a peculiar bone-tissue, bearing a very close resemblance to the ordinary bone of the skeleton. This outermost layer of the fang, commonly known as the crusta petrosa or cement, contains a large number of lacunæ, with numerous canaliculi radiating from them; these structures being similar to those which are met with in the long and in the flat bones. These lacunæ are placed in concentric laminæ around the dentine; an arrangement which is most evident in old teeth where the cement has attained a considerable increase of thickness. The great distinction between the structure of the cement and that of ordinary bone consists in the absence of Haversian canals. Even this distinction does not always hold good, since true vascular canals are often met with in this external layer of the fang. When this is the case, the canals become the centres around which the lacunæ are arranged in concentric rows, just as they are around the Haversian canals of other bones. Most externally of all, the fang is invested by a layer of periosteum, constituting another point of resemblance between this portion of the tooth and a cylindrical bone. The difference, therefore, between the cement of the tooth and other bones consists in the usual absence of Haversian canals, and in its inner surface being connected with the unvascular dentine, and through that with the pulp of the tooth; while the inner surface of one of the long bones consists of a light, cancellous osseous tissue, which is in direct communication, by means of the delicate internal periosteum, with the highly-organised and vascular medulla. The comparison which has just been drawn between the cement and bone would lead us to anticipate that there would probably be a considerable amount of resemblance between the pathological changes to which these structures are liable; and such will, I believe, be found to be the case: not only is the cement exceedingly prone to exostosis, but I shall be able to show you hereafter that it will occasionally take on inflammation, leading to the formation of abscess and partial caries of the newly-formed tissue.

Having thus pointed out the resemblances and the differences which exist between the fang of the tooth and the other bones of the body, the next point to be considered is the distribution and structure of its investing membrane or periosteum. It is somewhat remarkable, that even upon such a purely anatomical question as the limits and arrangement of the dental periosteum, the various writers on Anatomy and Dental Surgery are by no means unanimous. Thus, Hunter and Bichat considered that the periosteum which lined the socket also invested the fang of the tooth, and that therefore it consists of only a single layer which is common to the tooth and its socket. Other writers, on the contrary—and amongst these I may mention the names of Mr Fox and Mr Bell—are of opinion that there are two distinct layers of periosteum; one of these being continuous with that which covers the external surface of the jaws and forms the proper periosteum of the alveolus, while the other belongs to the fang of the tooth, the two layers being connected by blood-vessels and nerves which pass from one to the other. Mr Bell says, "the periosteum of the maxillary bones, after covering the alveolar processes, dips down into each alveolar cavity, the parietes of which it lines. From the bottom of the cavity where the vessels and nerves of the internal membrane enter, it appears to be reflected over the root of the tooth, which it entirely covers as far as the neck, at which part it becomes intimately connected with the gum." * The error which I conceive to exist in this description, is the idea which it gives of the periosteum of the tooth being a continuation or reflection of that which lines the alveolus; whereas, in reality, the two membranes have an entirely distinct origin. The alveolus is provided with its periosteum long before the crown of the tooth is completed, whereas in the tooth there is no periosteal layer until the formation of its fang and its investing layer of cement. At the period when the fang of the tooth is

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* *The Anatomy, Physiology, and Diseases of the Teeth*, by Thomas Bell, F.R.S. p. 41. 2nd edition.

about to be formed, the sac of the tooth-germ becomes adherent to the neck of the tooth; its outermost layer continues to grow in the same ratio as the fang, and becomes the formative organ of the cement.* When the tooth is completed, this membrane still remains, and constitutes its periosteum. At the apex of the fully-developed fang, the periosteum of the tooth becomes intimately associated with that of the alveolus, and the contiguous surfaces of the two membranes are connected together by the passage of blood-vessels and nerves. Mr Bell † says he has repeatedly removed a tooth from the dead subject, and found not only the root covered, but also the alveolar cavity lined with the periosteum. This fact is still more easily demonstrated in the teeth of some of the herbivorous animals, as in that of the common ox, where the periosteum of the tooth is a thick, spongy membrane, whereas that of the socket is an extremely delicate membrane, much more resembling that which lines the medullary cavity of a long bone than the tough, fibrous membrane forming the periosteum on the exterior of the jaw. A circumstance in the pathology of the teeth which seems to confirm this view of the nature and distribution of these investing membranes, is the extreme rarity—if indeed it ever happens—of osseous union between the teeth and their sockets; a condition which could hardly fail to be of somewhat frequent occurrence if the periosteal membrane was common to the tooth and the socket, or even if it was a mere reflection of the same membrane. When a section is made through the jaw and its contained tooth, the following is the relation of these parts to each other:—Most externally is the periosteum of the jaw; next, the substance of the jaw-bone, with the more delicate periosteal membrane which lines the alveolus. In apposition to this is the periosteum of the tooth, covering the layer of cement which invests the fang of the tooth, and which is intimately connected with the dentine, lined on its interior with the pulp, composed of connective tissue, nucleated cells, blood-vessels, and nerves. In passing from the centre of the tooth to the opposite side of the jaw-bone, the same parts will necessarily be encountered, only they will occur in the inverse order to that in which they have just been enumerated.

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* "The formation of the cement proceeds from that part of the tooth-sac which is situated between the pulp and the enamel organ, and commences even before the eruption of the tooth—as soon, indeed, as the fang begins to be formed. At this period, the tooth-sac becomes elongated at its lower part, is closely applied to the developing fang, and, from its rich network of vessels, furnishes—as the periosteum does during the growth in thickness of the bones—a soft blastema, in which nucleated cells become developed, and which then immediately ossifies. Accordingly, the cement is not formed by the ossification of the tooth-sac itself. I observed the first traces of it in newly-born infants, in the form of isolated scales of an elongated or roundish shape, which firmly adhered to the dentine of the still very short fangs, and looked exactly like the developing osseous substance in the cranial bones. The smallest of these presented distinct lacunæ, and had a slightly yellow colour, but were quite soft and transparent, and passed, at the borders, imperceptibly into a very clear blastema containing cells. In larger ones the borders were similar, but the middle was darker and firmer; and, in like manner, every intermediate condition was observed up to that of true bone, without any deposition of calcareous granules. As the fang lengthens, new bony scales like the above make their appearance, and gradually coalesce from above downwards into a simple layer, upon which, then, new bone is deposited, in the same manner, from without, to such amount as is necessary to form the entire thickness of the cement."—*A Manual of Microscopic Anatomy*, by A. Kolliker, p. 307.

† *Opus cit.*, p. 43.

The condition of the dental periosteum varies considerably at different periods of life, and according as the tooth is in a healthy or diseased condition. In infancy, when the periosteum is actively engaged in the formation of the cement, it is more easily demonstrated than in the adult, in whom it is so thin that it is often difficult to detect it. If, however, the pulp of the tooth has become inflamed, and this morbid condition has extended to the periosteum, then its presence is even more readily recognised than in the child. Later in life, when the periosteum frequently assumes a more active condition, and is engaged in the formation of fresh layers of cement, it again becomes thickened, and can be readily raised as a continuous membrane from the surface of the fang.

The periosteum of the tooth varies in thickness from the $\frac{1}{250}$ to the $\frac{2}{250}$ of an inch. This membrane is abundantly supplied with vessels and nerves, which are derived from two sources. The principal are those which are given off from the vessels and nerves which enter the pulp, and are, therefore, terminal branches of those important and extensively ramified cranial nerves, the fifth pair; the other source consists of communicating branches from the periosteum of the alveolus, and from the mucous membrane of the mouth, which is attached to the dental periosteum around the neck of the tooth. According to M. Magitot, the vessels and nerves are most abundant towards the apex of the fang.

Kolliker,* when describing the periosteum of the other bones, says, "it may be divided into two layers, which, although firmly united to each other, can be more or less perfectly distinguished by their structure. The outer layer is formed principally of connective tissue, and occasionally a few fat-cells, and is the principal seat of the vessels and nerves belonging to the membrane; whilst in the inner layer, elastic fibres, generally of the finer kinds, form continuous and often very dense networks,—in fact, real elastic membranes superimposed in several layers, the connective tissue forming the least important element."

In the periosteum of the tooth, a similar division into two layers may be observed, inasmuch as the outermost portion of the membrane, or that which is next the alveolus, is of a looser texture than that which is in immediate contact with the cement. The membrane is exceedingly strong and compact, and cannot be easily torn or broken up into its component elements by means of the needle. It consists of a dense fibrous tissue, the separate fibres being best shown by first softening the membrane in dilute acetic acid. When a portion which has been subjected to this treatment is examined beneath the microscope, the fibres can be separated either by the use of the compressor, or by tearing them apart. The fibres become somewhat wrinkled and swollen from the action of the acid, and numerous nuclei are seen scattered throughout their course. This structure forms the basis of the periosteum, and belongs to that class of tissues which corresponds to connective tissue. The treatment by acetic acid also discloses the presence of as many as three distinct kinds of cells, whose characters have been clearly defined by M. Magitot.[*] Some of these cells which are of small size contain one or two nuclei, and occasionally granular matter. These are the fibro-plastic cells of English writers, or the embryo-plastic nuclei[†] of M. Robin. Other cells of a larger size are present, having an irregular outline of a flattened or polyhedral form, filled with a granular mass, and containing a very variable number of nuclei, but generally more than two. These cells correspond to the "myeloid cells"[‡] of Paget, and the "mother cells" of other writers. They have been specially studied and characterised by M. Robin, who has given them the name of myeloplaxes,[§] because they are found in large numbers in the marrow of the bones, especially of young subjects. A third form of cell, but which is rarely met with, differs from the preceding in size, form, and structure. These cells are termed "cytoblastions;"[‖] they are of a spherical form, are filled with fine granulations, and do not contain a nucleus; their diameter is not greater than the width of the first-named or fibro-plastic cells. Here and there fat-globules are met with, measuring from the $\frac{7}{10000}$ to the $\frac{1}{1000}$ of an inch in diameter. I am enabled to confirm the presence of these various forms of cells in the dental periosteum, although I have not been able to detect them at all times in the healthy membrane, but more frequently when it has been somewhat thickened and inflamed. These elements are also more easily seen in the thick, spongy periosteum of the common ox.

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* *Opus cit.*, p. 176.

(To be continued.)

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[*] '*Mémoire sur les Tumeurs du Périoste Dentaire*, by M. Magitot, p. 3; Paris, 1860.

[†] These embryo-plastic cells are oval, rarely spherical; their outline is regular or slightly denticulated when they are somewhat elongated and less regular. Their length varies from $\frac{2}{1000}$ to $\frac{3}{1000}$ of an inch, while their width is about $\frac{2}{1000}$ of an inch, or something else.

[‡] *μυελος*, marrow.

[§] Myeloplax: *μυελος*, marrow; *πλαξ*, a plate. According to Robin, they measure from $\frac{1}{7000}$ to $\frac{3}{1000}$ of an inch. This kind of cell forms the basis of a large number of non-malignant growths which occur about the jaws and face. See a work called *Tumeurs à Myelopaxes*, by Dr Eugène Nélaton; Paris, 1860.

[‖] *κυτος*, a cell; *βλαστιον*, a bud.

DEFECTIVE PALATES.

A PAPER READ AT THE MONTHLY MEETING OF THE COLLEGE OF DENTISTS, TUESDAY, APRIL 2, 1861.

BY GEORGE WILLIAMS, M.C.D.E.

DEFECTS of the palate form a subject of considerable interest to the Dental Profession, and which has not hitherto been brought before the notice of the Members of this College in the form of a paper. I have, therefore, been induced to select this subject for your consideration this evening, partly because several of these cases have come under my notice, and partly with the desire of hearing the opinions of those who may have had greater experience in these matters than myself.

Defects of the palate may be divided into two classes—*congenital* and *accidental*. The first, as its name implies, is a natural malformation of the parts; while the second may arise from several causes, but most frequently depends upon the combined effects of syphilis and mercury on the system. It is the latter class which usually comes under the notice of the Dentist. Some of the older writers believed that congenital fissure of the palate was caused by a fright which the mother had received during the latter months of pregnancy: there cannot, however, be any doubt that it is a natural malformation. Mr Snell, in his work on Artificial Palates, published in 1828, states that he had in his possession a preparation in which the lips and palate were fissured in a fœtus of six weeks; and similar cases are recorded by other writers.

In giving the history of a case of congenital fissure from infancy upwards, I may appear to be introducing subjects which are foreign to the Dental Art, and which come more properly under the notice of the Surgeon: I trust, however, that the time is not far distant when all defects and diseases of the mouth will be entrusted to the Dental Practitioner. Many infants who are born with fissure of the palate die from inanition. Several contrivances have been made for the purpose of enabling the child to take its food with some degree of comfort. The best of these, I think, is that mentioned by Snell, and consists of a heifer's teat attached to the usual shield for sucking. On the upper side of the teat a piece of leather is to be attached, which, when introduced into the mouth, covers the opening by the pressure of the tongue, and so causes the milk to flow into the pharynx instead of out of the nose. It is only in some cases that this method will be found to succeed. When the child is weaned, nothing is better than a piece of good Turkey sponge. The sponge, which should be cut somewhat larger than the aperture, can be easily removed for the purpose of cleansing, and as easily replaced. Although this plan will not entirely close the aperture, it prevents any free communication with the nasal cavity, and, moreover, does not cause any amount of pressure to the sides of the fissure, which would not only tend to prevent the approximation of the parts if there was any inclination that way, but would even enlarge the aperture. Very little improvement can be made on the above plan during the period of childhood, or until an impression of the mouth can be taken. When this can be done, a thin piece of vulcanite may be adapted to cover the fissure : to this the sponge may be fastened by means of a fine gold screw and nut. This arrangement should be worn until a permanent cure can be attempted.

Various plans have from time to time been suggested for the cure or alleviation of persons suffering from fissure of the palate. M. Quesnay* recommends that a bandage should be used in infants, passing it round the head and face, for the purpose of bringing the parts gradually into contact. In my opinion, the wearing of such a bandage would ultimately distort the features, and would not be attended with any commensurate advantages. M. Jourdain recommends a piece of silk to be passed across the mouth, and fastened to the molar teeth, and tightened by degrees. M. Le Blanc† considers that fine gold wire should be used, instead of silk. The two latter methods, I should expect, would soon extract the temporary teeth, without bringing the sides of the fissure any nearer together. As I have previously stated, the sponge will, in my opinion, be found the best remedy until the patient approaches adult age, when, if deemed advisable, an operation may be performed. Even then it is only in some cases it can be accomplished, and that not always successfully.

This operation has received the name of staphyloraphy, and is thus described by Mr Fergusson : "With a knife whose blade is somewhat like the point of a lancet, the cutting edge being about a quarter of an inch in extent, and the flat surface being bent semicircularly, I make an incision about half an inch long on each side of the posterior nares, a little above and parallel to the palatine flaps, and midway across a line straight downwards from the lower opening of the Eustachian tube, by which I divide the levator palati on both sides, just above its attachment to the palate. Next I pare the edges of the fissure with a straight, blunt-pointed bistoury, removing little more than the mucous membrane ; then, with a pair of long, blunt-pointed curved scissors, I divide the posterior pillars of the fauces, immediately behind the tonsil, and, if it seems necessary, cut across the anterior pillar too, the wound in each part being about a quarter of an inch in extent. Lastly, stitches are introduced by means of a curved needle set in a handle; and the ends being tied so as to keep the cut edges of the fissure accurately in contact, the operation is completed."

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* *Mémoires Acad. Chir.*, vol. i., 4to.

† *Précis d'Opérations Chir.*, tom. i., p. 28.

This portion of my subject was fully explained to you by Professor Erichsen in a course of lectures delivered at the College in November 1859, an account of which will be found in the DENTAL REVIEW for that year.

A simple fissure of the palate will sometimes disappear spontaneously during the process of growth. Unless the deficiency in the hard palate is small, I believe it will be best treated by mechanical means. In the most favourable cases, the operation is both tedious and difficult, and very trying to the patient, owing to the impossibility of his inhaling chloroform. It is in cases where the velum is divided that the greatest difficulties present themselves. The division may be partial or entire, and may or may not extend to the hard palate. The greater the division, the greater the difficulty; and in extreme cases no successful issue must be looked for, as the traction resulting from approximation of the parts would be so considerable that adhesion would certainly fail.

There are several things to be considered before an operation is performed, even though the case be a favourable one for treatment. In the first place, the patient must be approaching adult age (not under twelve or fourteen years), he must be in a good state of health, and must fully understand that as much depends on himself as the operator for success.

Another mode of treatment has been introduced by M. Cloquet and with great success, and is on the principle of contraction in the healing of burns. This method cannot, however, be applied where the fissure is very great, and where applied takes considerable time to effect a cure. M. Cloquet applies a cautery to the commissure of the fissure at suitable intervals, and after many applications the space is gradually obliterated. This method is not so painful nor so hazardous as that just referred to, and the result has in many cases been found exceedingly satisfactory.

One of the most favourable forms of defective palate for an operation is mentioned by Dr Arnott. This gentleman relates the case of a patient in whom the imperfection of speech was very considerable, yet on looking into his mouth the velum at first sight appeared perfect. However, by the movement of the palatine muscles, as in speaking, the two halves of the velum were instantly contracted and drawn to each side, so as to leave a considerable opening, which allowed the voice to escape by the nasal passages. In a state of rest the edges of the fissure were closely in contact, while the effort to speak drew them to each side. An operation in his case would be the proper remedy, and would offer every chance of success; although it is only the minority of defective palates that offer an inducement to be operated on at all, and only some of those are satisfactory even after the greatest perseverance and patience on the part of both operator and patient have been bestowed.

A case is mentioned by the late Mr Liston, which he operated on at the University Hospital, and succeeded in getting a union in the entire length of the fissure; yet, after the parts were healed, he found that, instead of a serviceable velum, capable of closing or opening the nasal passages at will, he had a rigid, fleshy septum, stretching across from side to side, which was not only in the way of the ordinary movements of the tongue, so as to interfere with deglutition, but had also the effect of dividing the column of sound as it issued from the glottis, and so turned a part of it through the nasal passages. He was so dissatisfied with this result, that with one stroke of his bistoury he slit down the newly-formed velum, and undid in a moment all that a long and skilful operation, followed by patient attendance, had acheived.

I have thus far endeavoured to give the surgical treatment of this deformity and its results. Whilst we must all admit that an operation, if successfully performed, is far preferable to the mechanical treatment of these defects, yet it will be found that there are cases which cannot be treated surgically, or in which the patient will not submit to an operation, and we must then have recourse to those mechanical contrivances, to the consideration of which I propose to devote the remaining portion of this paper.

The formation of artificial palates or obturations is a subject that has engaged the attention of Surgeons and Dentists for centuries past. These arrangements are as numerous both in substance and form as could well be desired; but they can hardly be said to have kept pace with the other improvements which have taken place in Dental Science during the last few years, owing, I presume, to there being fortunately so few required in comparison to the other losses of the mouth. I know of no instance in which an obturation has been patented; not that I think that that is a sign no improvement has taken place, but I merely mention the fact. Let me be understood: by this I do not mean no improvement has taken place, for I think some has, both in form and the material with which obturators are made, especially with regard to the latter; but they have not kept a corresponding pace with other improvements with which we are familiar.

The earliest writer upon artificial palates was Alexander Petronius, who, in his work published in 1565, treats of the subject thus:—He says, "If the carious bone of the palate comes away of itself, or be brought away by art, pronunciation is altered, so that the patient is unable to articulate or make himself understood; but it is possible, in certain circumstances, to repair the loss. For instance, when there is but one aperture in the palate, it may be stopped with cotton or wax, or with a gold plate, or in any other manner which the genius of the artist may suggest, taking care to give these instruments the same concave form as the palatine roof."

Some few years later, in 1579, the subject is mentioned by Ambrose Paré in his work on Surgery. He says, "The filling of such cavity must be done with a plate of gold or silver, a little larger than the cavity itself; but it must be as thick as a French crown, and made like unto a dish in figure; and on the upper side, which shall lie towards the brain, a little sponge must be fastened, which, when it is moistened, it will fill the cavity of the palate, that the artificial palate cannot fall down, but stand fast and firm as though it stood by itself."

Tulpius, in his *Observationes Medici*, published 1685, just 106 years after the last-named author, mentions that "in many cases it is requisite to have recourse to silver itself, with sponge annexed." From that time to 1754, several authors refer to similar contrivances for obturations. At that date, Astruc, in his *Treatise on Syphilis*, mentions that the sponge, by absorbing the mucus, became corrupted and emitted a foul stench, and in consequence, for some time past, it had been usual to fit a small silver button to the plate by which it was fitted to the hole and suspended.

These obturators appear to have been constructed principally for fissures in the hard palate; for I find no mention made of any to supply the loss of the velum until 1780. At this time, M. Dubois Foucon invented an instrument with a moveable velum, and which is described as being composed of a long elastic band or metallic plate, with two flat circular heads, the anterior one being small, the posterior being of a size to fill up the vacancy in the velum. This plate extended from the palatine vault posteriorly to the injury in the velum, covering that part which was defective. That it might follow the motions of the surrounding parts, it was pressed towards the anterior third by two zigzag springs, each terminated by a small transverse plate, which was fastened to the teeth by ligatures. This instrument was a lever, the fulcrum being near the centre, the resistance behind the dental arch, and the power in the soft palate.

Other authors of a later date than these mention other contrivances. M. de la Barre seems to have given the subject great attention, and some very ingenious inventions are mentioned by him in a treatise he published at the commencement of the present century. Mr Snell devoted considerable time towards perfecting these instruments. But I think I have quoted enough to show that the subject has received much attention from an early period, and that the obturators of the present date are but modifications of those already mentioned.

(To be continued.)

THE DENTAL REVIEW.

LONDON, MAY, 1861.

The Distribution of Prizes at the Metropolitan School of Dental Science marks the second year of the existence of the Institution, and teaches once more the encouraging lesson that our young and rising members are commencing their careers by turning to advantageous account every opportunity that is to be obtained for acquiring a degree of knowledge beyond the mere routine of practice, and of acquiring, in a word, that stamp of information which in itself strengthens the practical mind, enables it to revel in varied fields of research, and wherever in nature it may turn, find resources innumerable, and amusements as entertaining as they are profitable.

As a man sows, so also shall he reap. Let this truth be ever present in the minds of our youth, and the result is to them certain. And such a result! They who have in these late years fought so earnestly for the advancement of the present noviciate in Dental Science may not, and indeed cannot, expect to see what that result will be, its greatness and its beneficence, as generation after generation arises to avail itself of the labours of the originators of English Dental Education. As was remarked by one of the speakers at the meeting to which we have referred, the members of the Dental Profession, under a good organisation, possess advantages for mental culture and scientific advancement such as has not been bequeathed to any other calling. The Lawyer, busied all day in his court, worn out with anxieties if fortune favour him with briefs, and still more worn out with watching and waiting if briefless he enrobe day after day in idle but necessary ceremonial, can never lay claim securely to an hour for the pursuit of any labour save his own; the Physician and Surgeon, always at the public service, ever holding in their minds gravest responsibilities, must steal from moments of rest and leisure the time for attempting so much as the advancement of their own great and beneficent sciences: but the Dentist has over his head no such onerous requirements; to him is given a laborious life truly and anxious in a certain way, but one to which rich hours of leisure are happily bequeathed, opportunities which a mind well prepared and stored can turn to infinite advantage, and a social position that, well preserved, can command attention and respect in every circle of scientific and literary life.

Speaking from good testimony, we are proud to believe that the young men who, the other day, came forward so honourably to receive the rewards of their first exertions, will appreciate what we have written in this place. We hope to see them in their after endeavours reaping as they have sown.

A pleasing fact, related and testified to thoroughly at the late Prize Distribution, ought not to be passed over. The plan of education adopted at the Metropolitan School of Dental Science is voluntary in its principle. No student who enters there is bound by any enforced curriculum of study. The teacher only is strictly obliged to be at his post; the student may come if he will. In this respect the principle is exactly the opposite to that adopted in a Medical curriculum. The Medical Student is overwhelmed with formalities: he must register, register, register; he must be ever at the call of his master; he must attend, *nolens volens*, a certain number of lectures, and take a certain series of rounds through the wards of his hospital. The utter fallacy of this discipline—the iniquities it engenders, the unfairness it carries with it, the chains it heaps on laudable ambition and intellectual strength, have been often exposed. Not long since, the 'Westminster Review' laid bare this rotten system with consummate ability. But argument as yet has told little, because the supporters of the enforced system, having had all the law and the prophecy in their own hands, have triumphantly asked for practical proofs that a free system would succeed. We are happy at last in being able to answer these arrogations. The free system has now for two sessions been tried; and men who have taught under both systems, and whose opinions no one can disavow, have stated openly and heartily that the free system of education is the best—is best for student and for teacher, and best for securing good educational results. These teachers have had good men, they say, and working men, under both systems; but by the enforced plan the good men would be good under any system, while by the free plan the very fact of a man entering to his work implies his worth.

The day will come when the bold and common-sense measures adopted by our first English Dental School will be accepted universally; and if the public could only see how, by the arbitrary rule of the Medical Colleges and Corporations, first-class men were now kept out of the Medical Profession, and the most indifferent of indifferent are coached into it on a set of blind formulæ and juggling antics, the reform now started would in a single Session be the custom of the land.

There is only one subject further to which we would refer. The promoters of the Metropolitan Dental School, anxious to forward the practical as well as the pure science of the Profession, have determined to make an effort to add to their Institution an Infirmary for Dental practice. This, in fact, is the only thing wanting to complete the structure they have so laboriously reared. To the attainment of this object, there is simply required co-operation and good-will. The exertions of the independent section of Dentists are amply sufficient to set on foot at once a first-class Infirmary of this nature. We beg them, then, earnestly to rally towards this movement. London affords ample scope, without any ridiculous rivalry, for two Dental Hospitals: scientific and liberal progress requires that there should be two such establishments. Without any wish to depreciate the existing Dental Hospital, we contemplate, therefore, with satisfaction the promised addition to our present educational resources.

SELECTED ARTICLES.

DENTITION AND ITS DERANGEMENTS.

By A. Jacobi, M.D., Prof. of Infantile Pathology and Therapeutics.

Lecture II.

(Continued from page 168.)

In Billard's opinion, congenital teeth are not firm, but are liable to get loose, and be lost; but such is not the experience of Meissner and others. The last author is, as a rule, opposed to the advice of Billard, and the practice of Whitehead, of extracting such premature teeth when they prevent sucking.

Meissner's opinion is, that no animal is prevented from sucking by the teeth in its mouth—a theory which is good enough for animals, but not for our race. Whitehead's case, in which it was necessary to remove a tooth to enable the mother to nurse the child, the fact that the nipples are very liable to become sore where the teeth are fully developed before weaning, and finally the few cases reported above, in which congenital teeth did not fall out to give place to the real temporary teeth, are valid proofs against such practice, at least in a number of cases.

Congenital teeth have been made the subject of special remarks by Dr Nessel, professor of dental surgery at the University of Prague. As his opinions differ somewhat from others, I will state them more definitely. He removed congenital teeth in three cases. In his opinion, they are, properly speaking, not genuine teeth, as they differ greatly in substance and form, and especially in the nature and consistency of their exterior layer. They are less firm and solid, and their enamel is white, but thin, and not formed at all in some parts. They are not inclosed in the dental alveolus, but have a loose attachment merely to the gums. The real teeth will appear afterwards; and his impression is, that such precocious formations are principally observed in individuals who will show the symptoms of general scrofula in more advanced life. He therein coincides with Capuron's opinion, who always considers the premature appearance of teeth as a symptom of a morbid constitution. He removed them, not because of any inconvenience to the mother on nursing the infant, but because, in sucking, the tongue is brought forwards, and is liable to become sore and ulcerated from the continued contact Some of Nessel's remarks correspond with Lassaignac's statements, who, by careful chemical investigations, found the teeth of younger animals to contain more organic matter than the older, as in the case of their bones ; but he is certainly mistaken in regard to those congenital teeth which prove to be real temporary teeth.

In Whitehead's cases, and in some others, the extracted teeth were reproduced. The facts, however, are sufficiently numerous, proving that this will not take place in every instance. Indeed it cannot, where the congenital are genuine deciduous teeth.

It is not at all desirable that deciduous teeth should fall out prematurely, or be removed, for the jaw thereby contracts, and undergoes a certain degree of atrophy, and consequently, when the permanent teeth appear, there is not sufficient room. Besides, the permanent teeth are larger than the deciduous teeth (as usually happens after the latter have fallen out, or been extracted); they, too, appear before the normal period : the jaw, then, not being sufficiently expanded, they are either out of the normal position, and are arranged in an irregular manner, or they are forced to form two rows. This anomaly cannot be remedied, because, as Canton justly observes, considerable changes take place in the form of the lower jaw-bone as the child advances in years. The angle formed by the ascending portion, or ramus, is at birth very obtuse, insomuch that under the age of four years it is impossible that the bone can be dislocated. The jaw enlarges or increases in size at the posterior part, not near the chin, in order that the additional molar teeth which the child acquires at the second dentition may find space, without disturbing or interfering with the teeth which correspond with those of the temporary set. This growth of the jaw continues up to the adult period of life, when all the permanent teeth have made their appearance. The ramus is then nearly vertical with the body of the maxilla, and forms a right angle with it. When, in old age, all the teeth have been lost, and the alveolar arch is closed by the absorption of the partitions of the sockets, the jaw again changes somewhat in shape, and is, apparently at least, thrown forwards. In some cases another occurrence will take place. The deciduous teeth may be firmly inclosed in the jaw and not give way to the onward pressure of the permanent set, which thereby are forced to change their direction, and protrude either in front of or behind the deciduous teeth. As in these cases the jaws are fully developed to their proper size, it is not only not injurious, but absolutely necessary, to remove the deciduous teeth in order to let the permanent set assume their normal position. A second variation is in the position of the teeth; and instead of one row normally developed otherwise, there are two or more. Columbus reports that one of his children had three rows of teeth. Valerius Maximus and Pliny relate similar facts. A son of Mithridates is said to have had two, and Hercules three. Arnold has met with a child of fourteen years having seventy-two teeth, thirty-six being contained in each jaw, and placed in two rows in a very regular manner, with the exception of the incisors, which exhibited some deviation. Baumès gives two similar cases; but in both the children were unhealthy, with feeble constitutions, and a scorbutic condition of their gums, Storch reports a case from an old collection of medical facts and essays; and Lanzoni gives instances of two rows in a new-born infant—in a citizen of Ferrara, and lastly, in Louis XIII., King of France, who is said also to have had three rows, by some writers who exaggerate the expression of Bartholinus, who reports the case:—"Item duplici vel triplici ordine dentium, qualem in piscibus nonnullis vidi et qualem Ludovicus XIII. Galliarum rex habuit."

A third variation is the appearance of teeth at a later period than the normal one. Van Swieten gives the case of a girl whose osseous system was well developed, and health perfect, but who had no teeth before the nineteenth month. Rayger relates the case of a girl who got her four temporary canine teeth when thirteen years old; Fauchard, that of a child from five to six years, who had a few incisors only. Brouzet knew a child twelve years old who had but one-half of the normal contingent set of teeth, the alveolar margin having the firmness and solidity of the gums of old age. Dugès has seen the first tooth appear in the eleventh, and Smellie in the twenty-first or twenty-second year. Lanzoni knew a child who had the first tooth, and the power of speaking intelligibly, in the seventh year. Ashburner reports the case of a very delicate though lively child, with large head, tumid abdomen, and peculiarly small-sized extremities, who cut the first tooth, an upper incisor, at twenty-two months, and remarks that many cases of tardy access of speech, and of stammering, are connected with erroneous development of the teeth. Schoepf Merei, who relates the case of a child who had the first tooth at three months, and eleven at eleven months, has seen a child who had no teeth when several years of age. Maury attended a girl of seven years, who had not her first lower incisors, the space being sufficient for three teeth, and the alveolar processes being low and narrow. I have had under my observation a boy of the age of two years and ten months, at which time he had not a tooth, nor a symptom of approaching dentition. The records of the Children's Department of the German Dispensary of the City of New York contain a similar instance in a child of two years of age. Amongst the four hundred observations on dentition reported by Eichmann, there were a few in which the first tooth cut at twenty-two months; and in a case described by Churchill the first tooth cut at seven years of age.

A fourth variation, of which there are a very small number of observations, consists in the absence of teeth. Botallus gives the case of a woman of sixty years who never had a tooth. Oudet is of the opinion that the cause of this anomaly must be looked for in an early inflammation and suppuration of the dental germs. Valla reports the case of Pherecrates, and Baumès that of an adult man who never had teeth.

The fifth anomaly is the absence of a number of teeth, instances of which are also on record. One or two have been mentioned by me. Storch describes the case of his own daughter, who had no canine teeth; Linderer, that of a girl fifteen years old, who never had either of the four upper incisors. I have myself known a lady with but two upper incisors.

Finally, the following anomalies of doubtful character may be mentioned:—Plutarch and Valerius Maximus report that

Pyrrhus, king of Epirus, and a son of Prusias, king of Bithynia, had only one bone on each jaw, instead of the full contingent set of teeth. And Bernard Jengha was in possession of a skull, in the upper jaw of which (this being the only one found) only three dental masses were contained, the central one corresponding with the incisors and canine teeth, and each of the two exterior ones with five molars. Perhaps, however, these cases belong to the class of those descrided by Eustache and Sabatier, in which a number or a whole set of teeth were incrusted by a hard stony substance, thus producing the impression of a single dental mass, or a limited number of abnormally-developed teeth.

As a rule, authors assert that teething at a later period interferes less with general health than at the premature period of life Morbid symptoms in the former cases are stated to be less frequent. But delayed teething seldom stands as an isolated fact, but is an undoubted proof of some morbid condition in nutrition and general development. In the large majority of cases a notable retardation in the eruption of the teeth is but one of the symptoms of derangement and faulty development of the osseous system and the organism in general. The bones of the infant should be developed with the same equability as its other parts. Premature teething, premature walking, and premature ossification of the cranial bones, usually co-exist; so do protracted teething, retardation of walking, and retardation of the ossification of the cranial bones and fontanels. They are far from being favourable symptoms, and are too frequently the first symptoms of rachitis. Old Heister and Storch were already aware of this fact. To what extent the general health and constitutional vigour correspond with the formation of the teeth, and the development of the osseous system, is clearly shown by the following inquiries of Merei.

Of twenty healthy and robust children, the large cranial fontanel was closed in ten at from eleven to thirteen months; in five at thirteen ; in two at fourteen ; in two at ten ; in one at fifteen. In fourteen of these the first teeth cut at from six to eight months ; in four at from eight to nine ; in two before the sixth month. Consequently, there is, in healthy children, an interval of from four to seven months between the cutting of the first incisors and the closure of the fontanel.

Of eight feeble or sickly, but not rickety, children, the large fontanel was closed in six at from eleven to thirteen, in two at from thirteen to fourteen months of age. In seven of these the first incisors cut from four to seven months before the closure of the fontanels ; in one the cutting of the first tooth, which took place at thirteen months, was directly succeeded by the closure of the fontanel. Thus it appears, that feeble, but not rachitic, children, differ little in the proportionate time in which the several parts of the anorganic portion of the body is developed, except that the general development is usually a little slower.

Of eight rickety children, the fontanel in three was closed in the thirteenth month; symptoms of rachitic mollification of the osseous system developed themselves immediately afterwards; the incisor teeth came at the regular time, the other ones too late. In three the ossification of the cranial fontanel took place between the sixteenth and nineteenth month, the first tooth having made its appearance at the age of twelve months, the others following in rapid succession. In one the large fontanel was open at nineteen months; the first teeth cut at the regular time, while rachitis was not yet present; but at eighteen months there were but eight teeth present. In one case of severe rachitis, neither the fontanel was closed nor had the eruption of a single tooth taken place at the age of twenty-five months. I have deemed it important thus to consider the anomalies of dentition and the connection of the eruption of teeth with the development of the osseous system, and finally allude, in passing, to its relations to the general health, and the constitution of the patient.

TREATISE UPON THE GENESIS AND DEVELOPMENT OF THE DENTAL FOLLICLES TO THE EPOCH OF THE ERUPTION OF THE TEETH.

By Drs Ch. Robin and E. Magitot.

(Translated for the 'Dental Cosmos,' by E. Sureau.)

(Continued from page 126.)

In some of the Mammifera, the hog for instance, these osseous partitions unite between the incisors and the canines a little after the occlusion of the follicular wall, under the form of a sack, considerably before the union of the corresponding partitions takes place between the molars. These partitions are formed according to the method of ossification called *invasion;* that is to say, by the production of a thin and narrow cartilaginous projection, which ossifies almost as soon as it is formed; so that the two parts appear opposite each other on the corresponding faces of the walls of the groove, presenting a thin cartilaginous varnish on their surface in train for ossification by production. But as they are only produced after the follicles have appeared and have become considerably developed, we need not devote any more space to this subject at present, since at the time of which we are speaking (from the fifty-fifth to the sixty-fifth day of the human fœtus) they are not yet in existence.*

The two laminæ of the lower maxillary, which confine the dental groove, and from which the partitions spring, are thin, flexible, and easily detached by rupture along the side that is in continuity with the rest of the bone near the bottom of the groove. The outer face of both of the laminæ is convex; that of the inner plate is swollen at the level of the molars, and projects at that place above the lower part of the bone. The outer face of the external lamina is especially convex at the level of the canines and incisors. It follows from this arrangement that the body of the maxillary is swollen as if it were bloated. At the back the inner plate exhibits a swelling much more marked than the other; it advances upon the corresponding face of the ascending branch, from which it is at first separated by a fissure, in a fashion that presents a protuberance which is a sort of apophysis, and which unites afterwards with the inner face of that branch. It is originally developed upon the body or lower edge of the bone while raising itself above it; it bears the shape of a lengthened, projecting, laminated apophysis, and is prolonged into a point at the side of the ascending branch, as we will see hereafter. The anterior extremities of the bone, at the symphysis, are at this age rather irregular in the already ossified part; this part is covered with a thin bed or cartilaginous varnish. They adhere by this medium to the two lateral faces of the uneven or common middle part of *Meckel's cartilage;*† this adherence is so slight that they can be separated from it without breaking it, notwithstanding its great fragility at this period.

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* The manner of production of the partitions which change the middle and upper part of the dental groove into the condition of alveoli, and the bottom into an osseous canal for the vessels and nerves, has been generally passed over or badly explained. This will be shown in the following quotations (what has been said by Hunter will be pointed out hereafter). "The fibrous laminæ, which separate the follicles during the first months, become ossified." (Oudet, Art Dent., Dict. de Méd., 2nd ed., Paris, 1835, vol. x., p. 105.) "The follicles are at first crowded against each other, immediately above the trunks of the alveolar vessels and of the nerve, separated only by a soft substance which draws out in threads between the fingers. Near the middle of the embryonic life, the walls which separate them, and which in lining the bottom become firmer and stronger, are ossified little by little, and at length constitute the alveoli. Ossification begins at the bottom, after which it gains the partition, from the bottom as far as the alveolar ledge." (Henle, General Anatomy.) We have seen that this is not the only way by which these walls are formed. None of the authors insist upon the fact that the follicles originate near the vessels, at the bottom of the groove, and consequently in that part which afterwards becomes the dental canal. We will see, in addition to this, that the inner face of the groove has not at this time any distinct periosteum of the tissue incasing it, and that the osseous substance is found there in direct contact with the latter.

† This organ is also called *Meckel's prolongation*, from the name of the author, who was the first to recognise its existence. (Meckel's Manual of Anatomy.) Meckel has observed that birds, reptiles, and fish have a cartilage exactly similar, extending from the posterior piece of the jaw to the anterior. This cartilage originates before the inferior maxillary, and in the beginning

The connection between *Meckel's cartilage* and the lower jaw is sufficiently intimate at this time, to make it necessary for us to devote some of our space to the consideration of an organ that has been too much neglected by many anatomists. It is the more important from the fact that in some animals, as the hog, it has at first a connection with the inner part of the dental groove which contains the follicles of the lower incisors.

Meckel's cartilage is developed in the first branchial or visceral arch, as has been stated, previous to the inferior maxillary. The latter has its origin on the outer side of the former, near the middle, and adheres to it by simple contiguity. The cartilage is longer but thinner than the maxillary, and spreads from the median line, where it is in continuity of substance with its congener on the opposite side, as far as the base of the cranium, at the level of the middle cell at the place that will be occupied by the middle ear. Here it passes between the petrous portion of the temporal and tympanic ring or frame. It is cylindroidal through most of its length, and is only about two-hundredths of an inch in height upon a thickness a little less. It, however, offers sufficient resistance, and is easily dissected.

Before passing under the tympanic frame it becomes bifurcated, and the malleus is developed at the expense of the upper branch, which remains for a long time in continuity of substance with the latter. The lower branch is inserted at the neck of the malleus, forming a connection at its cartilaginous extremity by a little ligament; ossification changes it at a later period into Raw's slender anterior apophysis, or Folius's process. When the cartilage of the malleus is once developed and the preceding connections established, Meckel's cartilage exhibits throughout its whole extent the following characteristics:—*

It is a single symmetrical organ which spreads against the inner face of the jaw and beyond it, from the mesial line to the drum of the tympanum. Its general form is a little like that of the adult osseous lower jaw; that is to say, an ogive at the anterior summit, and more or less tapering. The size of this organ varies according to the species of animal and the age.†

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forms essentially the skeleton of the first visceral arch. Richard Owen, in his remarkable Principles of Comparative Osteology, has clearly stated that "the malleus is a modified element of the tympano-mandibular arch in the batrachia and fish," as it represents the bone called by him the *mesotympanic*, and by other anatomists called *symplectic*. He considers the cartilage of Meckel in the Mammiferæ an extension of the thin apophysis of the malleus.

* Meckel had seen only one of the branches of the cartilage—the one inserted at the head of the malleus, and he points it out as placed above the slender anterior apophysis. "We can at most admit," says Meckel, "that the latter is at first part of it, and that it is separated from it very early."

† That which precedes as well as that which follows is propounded according to the pieces resulting from our dissections of the human fœtus and those

The anterior extremity of this organ is placed between the corresponding ends of the two halves of the inferior maxillary—it is thin, and a little enlarged vertically. There is no discontinuity or division of substance into two contiguous halves at the median line. But it is separated, by bifurcation, into two cartilaginous fasciæ, adhering immediately to the inner face of each of the horizontal portions of the corresponding maxillaries. Each branch is flattened at first, and a little widened like a spatula; and they adhere to that part of the inner plate of the maxillary which bounds the groove of the incisors. They assume a rounded form near the level of the canine, where they are a little above the bottom of the groove, being nearer to the lower edge than to the inner upper edge of the bone. Each branch is partially enclosed in a small, regular furrow of the maxillary, below the projection of the inner plate of the groove of the follicles and vessels. The cartilage has no relations of contiguity with these last organs that are contained in the bottom of the groove, and is separated from it by the inner plate of the groove; then beyond, near the ascending branch of the maxillary, it passes below the dental nerves and vessels, bending a little toward the top. It extends beyond the upper edge of the ascending branch, which it crosses near the middle of its height. At one or two millimetres (*millimetre* 0·03937 *inch*) behind this branch each congener half of the cartilage is divided in its turn into two subdivisions: the upper one, being slightly bent, reaches the head of the malleus and unites with it; the other, only half as long, ceases to be cartilaginous before it reaches the level of the tympanic frame, and continues by a greyish, fibrous ligament, which is more slender than itself, and is inserted in the neck of the malleus at the place afterwards occupied by the slender apophysis of Raw or Folius.

The crest, myloidian, or inner oblique line of the lower maxillary, is already developed, and even very protuberant, near the fourth month, at the time that *Meckel's cartilage* is still easily dissected and detached below it. The furrow of the mylo-hyoidian nerve nearly corresponds to the upper edge of Meckel's cartilage, near the posterior orifice of the dental canal.

All authors agree in saying that *Meckel's cartilage* is gradually atrophied before the eighth month, starting from the jaw near the ear, without ossifying, or forming a point of special ossification for the lower maxillary. We have not met it after the seventh month

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of other Mammiferæ, and differs in some respects from the descriptions given by the numerous authors who have verified Meckel's discovery. Among others, Reichert has most closely studied the evolution of *Meckel's cartilage*, and according to him the *incus* originates at the expense of one of the branches of Meckel's cartilage. (Reichert, *Uber die Viseeralbogen der Wirbelthiere im Allgemeinen und deren Methamorphosen bei den Vœgeln und Sœugethieren.—Archiv für Anat. und Physiol., von J. Mueller*, Berlin, 1837, 8vo, p. 120.) We have not been able to see this communication, which may perhaps refer to the already rather advanced age of the embryos that we have dissected.

of gestation.* Nevertheless, its middle part seems to continue to assist at the formation of the maxillary symphysis before its ossification.

(To be continued.)

HIPPOPOTAMUS TEETH OR TUSKS.

BY THOMAS D. ROCK.

(From the 'Technologist.')

One great difficulty — happily not always insurmountable — which invariably attends the path of the technological student, is that which arises from the erroneous application of proper names. Thus, the article now proposed for consideration is treated by different authors under the terms sea-horse teeth, morse teeth, and hippopotamus teeth—the first two names being applied, indiscriminately, both to the walrus and hippopotamus ;

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* In 1815 Spix described and represented the plate which forms the inner alveolar ledge, as the point of ossification peculiar to the lower maxillary. According to him it remains distinct and separate until the fourth month of the intra-uterine life ; a line of demarcation continues between this plate and the rest of the inferior maxillary. (Spix, *Cephalogenesis, sive capitis ossis structura, formatio et significatio per omnes animalium classes, familias, genera ac ætates digesta atque tabulis illustrata, legesque simul psychologiæ, cranios capiæ ac physiognomiæ inde derivatæ.—Monachii*, 1815, and not 1825, as is stated by various German authors ; folio, p. 20.) Meckel justly remarks that the internal alveolar edge of the lower jaw is developed under the form of an apophysis projecting behind, in relation to the rest of the bone, with which it makes part in front ; it is at first separated from it by a fissure behind, without any cartilage to close it. But when in the progress of development this kind of apophysis has reached the ascending branch, it unites in the form of a bridge with the inner face of the latter, which gives birth to the maxillary foramen, without there being any special osseous nuclei for this edge of the maxillary. Meckel adds that in the beginning the maxillary canal is not yet closed in its upper part, and is confounded with the space limited by the two dental edges. (Meckel, *Manual of Anatomy.*) It is evident from the preceding that Spix is not speaking of *Meckel's cartilage*, and that he has never seen it ; for this organ has no point of connection with the alveolar ledge. M. Cruveilhier has described "upon the fœtus from fifty to sixty days, a kind of needle running along the inner face of the body and branch of the bone ; this needle is completely free on one-half of the maxillary, adhering to the other half through the inner third of its length." M. Cruveilhier adds that the spine which crowns the orifice of the dental canal is no other than the inner extremity of this osseous needle, which will form the inner edge of the dental canal rather than the inner alveolar ledge as according to Spix. M. Cruveilhier calls this osseous plate *Spix's needle, the point of ossification*, and *the osseous point of the dental canal.* (Anatomie Descriptive, Paris, 1843, second edition, 8vo, vol. ii., pp. 184 and 185.) It is easy to see, after what has been said, that *Meckel's cartilage* is not the question here—it is nothing else than the inner plate of the groove which contains the follicles and vessels : it is developed in the manner indicated by Meckel, but does not form a point of special ossification.

although I believe that, *commercially*, the term sea-horse is restricted solely to the teeth of the latter animal.

The word hippopotamus is compounded of two Greek nouns, ἵππος and ποταμὸς, and literally signifies "the river-horse," a name bestowed upon this singular animal by the ancients, to whom it was very probably suggested by the amphibious nature of the creature, and the striking resemblance which its profile bears to that of the equine family; more especially when seen just emerging from the surface of the water, with ears erect, the unwieldy body, at the same moment, being hidden from view.

Visitors to the Regent's-park Gardens, where two hippopotami are to be seen constantly enjoying the pleasures of the bath, may, by careful observation, verify for themselves the appropriateness of the name thus bestowed upon this interesting mammalian.

The Dutch Boers of South Africa distinguished this animal by the rather curious appellative of "zee-coe," or sea-cow.

Hippopotami form by themselves a distinct genus of the pachydermatous, or thick-skinned animals; and even of this distinct genus there is but one living species—"*Hippopotamus amphibius*"—found exclusively in certain parts of the African continent.*

The interest attaching to this animal from an economic point of view is rather limited, being confined to a local use of its skin and flesh by the African natives and colonists, and the more general application of its powerful teeth, or tusks, as a substitute for true ivory.

However interesting it might be to consider the general anatomical and physiological features of this gigantic creature, or to trace out the resemblance thought to exist between it and the "Behemoth," described in the Book of Job, I propose to confine my remarks exclusively to its singular dental apparatus, and such other matters as relate immediately thereto.

The mouth of the hippopotamus is one of the most capacious in the animal world, and is armed with a set of teeth of the most powerful description, adapted solely for cutting and bruising its food, which is of the coarsest and rankest kind, and such as is found lining the banks of the tropical rivers of Central and South Africa.

The dental formula is as follows:

$$\text{Incisors - -}\left\{\begin{array}{l}\text{upper jaw - 4}\\ \hfill\text{—}\\ \text{lower jaw - 4}\end{array}\right. \qquad \text{Canines - - -}\left\{\frac{1\text{—}1}{1\text{—}1}\right.$$

$$\text{Molars - -}\left\{\frac{7\text{—}7}{6\text{—}6}\right. = 38 \text{ teeth in all.}$$

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* Some Naturalists distinguish between the hippopotami of South and West Africa, making two species—*H. Capensis* and *H. Senegalensis*—but the difference is so small, that this division is for the most part rejected.

The molars evidently play but a secondary part in the economy of this animal, and a portion of them are described as "strictly false molars;" that is, the three molars of both jaws that succeed the canines, and which are conical in form, having only one point. The posterior molars are armed with two rows of points, which gradually wear down to a trefoil surface. To man, the molars of the hippopotamus are perfectly useless.

Incisor teeth, as the name imports, are the cutting instruments of the jaw; and of these teeth, which are situated in the fore front of the mouth, the hippopotamus possesses eight; four in the upper jaw, which are short, conical, cylindrical, and curved slightly inwards; and four in the lower jaw, cylindrical, straight, pointed and projecting forwards, the two centre ones especially, termed lateral incisors, which are both longer and larger than those next the canines. These incisor teeth are of some value in the arts for their ivory.

It so happens, that the teeth most highly prized by man are those that occupy the most prominent place in the dental economy of the hippopotamus: these are the canines, which may be described as "enormous tusks," sharpened at their points, by mutual attrition of those in the upper and lower jaw, into oblique "chisel-like edges." They are four in number, two in each jaw; the upper ones being short, slightly curved, rounded on the outer side, deeply furrowed in the centre on the inner side, and ridged longitudinally, more especially on that portion of the tusk which is coated with the enamel. The canines of the lower jaw are considerably larger, are very much curved, like the tusks of a boar, and in shape somewhat elliptical; they are also ridged after the same fashion as those in the upper jaw.

Both the incisors and canines of this animal, although popularly called teeth, are virtually tusks; for they are uninterrupted in their growth, are formed on cores, and consequently hollow for a considerable portion of their length.

The canine teeth or tusks of the hippopotamus are primarily composed of the two substances known as *dentine* and *enamel;* the first-named forming the principal body of the tusk, whilst the enamel is merely an external shield, or tooth armour, of a denser and more durable material, and described as sufficiently hard to strike fire when contused with steel.

The enamel is not continuous throughout the entire circumference of these tusks, but only to the extent of from one-half to two-thirds of the whole, and occurs on such portions as appear to be the most exposed to injury . lengthwise, the enamel extends from end to end, and is formed anew, in conjunction with the dentine, as the tusk grows. In thickness, the enamel varies from 1-32nd to 1-16th part of an inch, according to the size of the tusk. River-horse or hippopotamus teeth contain less organic matter (33·00) than either elephant ivory or the tusk of the walrus, in which substances the organic elements amount to about 44·00 and 38·00 per cent. respectively. The chemical composition of these teeth, as well as the essential difference between their dentine and enamel, is advantageously illustrated in the following analyses by Thomson.

HIPPOPOTAMUS TEETH.

Constituents.	Enamel.	Dentine.
Organic Matter	4·102	33·41
Phosphate of Lime	83·630	55·90
Fluoride of Calcium	0·850	
Phosphate of Magnesia		1·19
Carbonate of Lime	10·620	9·14
Chloride of Sodium Chloride of Potassium	0·800	0·36
Total	100·002	100·00

Sp. gr. of the dentine, 1·866

A mere glance at the foregoing table is sufficient to discover the more prominent qualities of the teeth now under consideration. The larger proportion of mineral matter in this dentine, coupled with great density of formation, renders it both harder and less liable to receive stains than other bone substances; whilst to the smaller amount of organic matter, and the almost entire absence of oily particles, the delicate and superior whiteness of these tusks is to be attributed. It is the combination of these especial qualities, density and whiteness, that makes the hippopotamus teeth so invaluable to the Dentist.

On the other hand, the absence of oily matter, and the comparatively smaller amount of animal substance in this bone, induce brittleness, and cause it to be more easily affected by the acids of the food and saliva.

The enamel is still harder and whiter than the dentine, by reason of its being composed almost exclusively of phosphate of lime, with only about 4 per cent. of organic matter. Dentists are the principal consumers of the canines of the hippopotamus; for no bony substance has hitherto been found that possesses, to so great an extent, the properties requisite to the successful performance of their art. Mineral teeth are, for the moment, in great favour; but, after all, it is very questionable if any artificial substance can be made so appropriate as the precise material which an infinitely Wise Being has selected, and supplied, both to man and the lower animals, for the purpose of mastication.

When these tusks are employed for the manufacture of front teeth, the enamel on the surface is valued, and retained, for the sake of its delicate whiteness and density, as before described; and the tusk is so manipulated that this enamel forms the outer or visible surface of the teeth. But when used in the production of artificial gum, or back teeth (molars), the enamel is removed by the aid of a chisel and grindstone, or, more frequently, by steeping the tusks or sections thereof in a solution of muriatic acid, sufficiently long to destroy the enamel, without affecting the dentine; the softer parts, at the same time, being coated or painted over with some fatty substance, to preserve them from injury during the operation. Sometimes the blowpipe is resorted to as a means of removing the enamel, and a fine file is afterwards used in either case, for imparting the final surface to the bone. The points of the canines are generally defective, and in the process of working are first removed, the tusks being afterwards sawn into transverse sections, of varying thickness, according to the destined application, and as required by the operator.

Although the teeth of the hippopotamus are all but monopolised by Dentists, yet the very excellent quality of their dentine is more widely appreciated, and likewise adopted for a few other purposes in the arts. When great delicacy is required, this bone is found more suitable for carvings than the ivory of the elephant, and is much used in France for this purpose, especially in the manufacture of fine brooches.

The handles of surgical instruments are sometimes formed of this material, for which purpose it is admirably adapted, because of its being less liable to receive stains than other sorts of ivory.

Vases made of hippopotamus tusks were displayed in the Great Exhibition of 1851; and in the Irish Exhibition, a Mr R. Barter, of Dublin, exhibited some elegant intaglio brooches, consisting of figures carved in the same substance, and mounted on a groundwork or surface of cornelian. The enduring nature of the hippopotamus ivory appears to have been known and valued as early as the first century; for, according to a writer named Pausanias, a certain Greek statue of "Dindymene" had its face "formed of these teeth, instead of elephant ivory."

A few words on the incisor teeth of the hippopotamus received into commerce will suffice. They are not so generally imported as the canines, with the exception of the two lower, lateral, and projecting incisors, commonly called tusks in the market, as distinguished from the canines, which are usually termed teeth. These projecting incisor teeth, as already described, are long, straight, and hollow for a portion of their length, like the canines; but differing vastly in quality from the latter, being considerably softer, and more easily affected by the fluids of the mouth, so that they are seldom used by Dentists. Yet these long, straight teeth have their especial application, being employed in the manufacture of the long knitting needles and netting meshes used by ladies, as well as for other more general purposes. The enamel on these lateral teeth appears to be confined to the projecting point, and does not extend into the jaw.

The smaller and curved incisors of the upper jaw are comparatively valueless, except for common turnery work.

I may here mention, that unless the teeth of the hippopotamus are employed by the Dentist, the enamel is always removed, and generally by means of an acid bath, as no ordinary tool produces any effect upon it.

As the Board of Trade returns furnish no separate account of the imports of hippopotamus teeth, I cannot give any statistical table of the extent of our trade in this article, but should roughly estimate the quantity imported at from 7 to 10 tons annually; which, considering the limited source of supply, is far from being small. The importation of these teeth into Liverpool in the year 1850 was 2½ tons; and as by far the larger quantity received enters the port of London, I think my estimate of the total is not overdrawn. The value of hippopotamus teeth depends both upon size and quality—those being the most esteemed that are large and free from flaws. In years that are past, as much as 30s. per lb. has been paid for fine tusks; but the price may now be said to range from 1s. per lb. to 17s. or 18s. per lb. At a recent sale, some very small teeth realised only 7½d. per lb.; but the following table, compiled from a sale at the end of last year, will perhaps convey to the reader a better idea of the comparative value of these tusks.

Teeth	averaging each	6lb.	realised	17s.	per lb.
”	”	5¼	”	13s.	”
”	”	5⅕	”	8s. 9d.	”
”	”	5	”	11s.	”
”	”	4½	”	11s. 6d.	”
”	”	4⅕	”	14s. 3d.	”
”	”	4	”	10s.	”
”	”	3¾	”	8s. 6d.	”
”	”	3¼	”	6s. 6d.	”
”	”	3	”	3s. 7d.	”
”	”	2¾	”	4s. 9d.	”
”	”	2	”	2s. 2d.	”
”	”	2	”	1s.	”
”	”	1½	”	1s. 1d.	”
”	”	1⅓	”	2s. 4d.	”

Allowing 20 lb. on an average for every set of hippopotamus teeth imported, and presuming our total imports are 10 tons, no less a number than eleven hundred of these giant creatures must be slaughtered every year to supply our markets.

At the present time, the demand for hippopotamus teeth is small, and no scarcity is felt; but as civilisation advances in West and South Africa, and the animals become gradually exterminated, it is probable that the time may come when this comparatively insignificant, though useful and valuable article of commerce, will be sought after in vain.

PROCEEDINGS OF DENTAL SOCIETIES.

COLLEGE OF DENTISTS OF ENGLAND.

MONTHLY MEETING.—April 2, 1861.

R. T. Hulme, Esq., in the Chair.

The Fourth Monthly Meeting was held on Tuesday, April 2; the chair being occupied by R. T. Hulme, Esq.

The minutes of the last meeting having been read and confirmed, Mr Williams announced the following donations to the Library:

Mr Dubois—Mayo's Outlines of Physiology.
Mr Hulme—Moquin Tandon's Medical Zoology. Translated and edited by R. T. Hulme.
Mr Henry—Delabarre's Mechanical Dentistry, 2 vols.

The Chairman exhibited a fibrous tumour, and a portion of the left side of the lower jaw, which Mr Spencer Wells had removed from a female aged twenty-seven. The Chairman stated that the patient had first consulted him in January last, and informed him that the tumour had commenced as a small growth about four years ago. When first observed, it was about the size of a pea, and originated in close proximity to a decayed tooth: how far this had been the exciting cause of the morbid growth, it was impossible to say. About a year ago, it had taken on a more rapid growth, and had gone on gradually increasing until seen by Mr Hulme. At that time the tumour was as large as a hen's egg, and filled a considerable portion of the mouth on the inner side of the jaw; it had risen up so as to come in contact with the upper teeth, and prevented the proper closing of the mouth. Two stumps remained imbedded in the centre of the tumour. The morbid growth had completely infiltrated the osseous tissue of the jaw-bone, and so completely displaced the bicuspid teeth, that these had been carried forward to the anterior part of the mouth, until they were placed behind the canines and lateral incisors of the same side. One of the bicuspids was removed, bringing with it a portion of the tumour. The lacerated portion of the diseased mass bled very freely, but was arrested by the application of cold water. Upon examining that portion of the tumour which had come away with the tooth beneath the microscope, it was found to be of a simple fibrous growth. Under these circumstances, Mr Hulme had recommended the patient to submit to an operation for the removal of the tumour, as the only possible means of cure. Mr Spencer Wells had kindly taken the patient into the Samaritan Hospital, and successfully removed the tumour, the patient being under the influence of chloroform. Mr Hulme particularly called attention to the mode in which Dr Richardson administered the chloroform, an account of which will be found in the Quarterly Retrospect published in our last number. Photographs of the patient, taken before the operation, were also exhibited.

Mr Vidler exhibited several specimens of teeth in which the fangs were more or less exostosed. In one of the specimens, an upper molar, the two outer fangs were conjoined by intermediate osseous matter.

Mr RYMER called the attention of the meeting to some cases reported in the January number of the 'Dental Cosmos,' under the title of Explosion of Teeth, by Dr Atkinson. Since the last meeting of members, the following case had come under his notice: A bicuspid tooth, which was much decayed, had been stopped with amalgam some months ago. The tooth remained perfectly comfortable for upwards of six weeks, but symptoms of uneasiness eventually gave notice of something wrong; the pain soon became most intense, and the patient sought relief in extraction. Mr Rymer not being at home when she called, on the advice of another professional man she was induced to delay the operation in the hope that the pain would pass away, and she accordingly returned home, a distance of several miles. Night brought no relief, and the pain became so fearfully intense that, as she afterwards said, it was impossible to describe it, and indeed she was nearly driven mad, when all at once the tooth burst asunder, and perfect ease was instantaneously produced. Mr Rymer said that this was the only case of the kind that had ever come under his notice, although he had heard of a few analogous cases, the most remarkable of which were those of Dr Atkinson's to which he had previously referred.

Mr WILLIAMS then read a paper 'On Defective Palates.' He commenced by observing that defects of the palate were divided into two classes—*congenital* and *accidental*. After reviewing the various plans which have been suggested at different times for the alleviation of these disorders, he proceeded to describe the operation for the radical cure of fissures of the palate and velum, as proposed by Mr Fergusson. The remainder of the paper was occupied with a description of the various mechanical contrivances which had been introduced for remedying defective palates which were either unsuited for an operation, or in which the patient would not submit to one. The earliest writer upon artificial palates was Alexander Petronius, in 1555. Ambrose Paré, the celebrated French Surgeon, describes a silver obturator. Tulpius, Astruc, Foucou, Snell, and other writers, have all given descriptions of different forms of these instruments; the common method consisting of a piece of sponge, somewhat larger than the opening in the palate, attached to a plate of gold or silver. Mr Williams then exhibited and described several very beautifully executed obturators in gold and vulcanite. He particularly remarked upon the advantage which vulcanite presented for remedying these defects. Some of these contrivances were adapted to simple fissure of the hard palate, while others were provided with an artificial velum. The various obturators exhibited by Mr Williams were very beautiful specimens of workmanship, and were greatly admired by the members. A discussion followed, in which the Chairman, Messrs Perkins, Kempton, Greening, Comley, Rymer, Hockley, and others took part; and after a vote of thanks to Mr Williams, the meeting adjourned.

MONTHLY MEETING.—The next monthly meeting of the members will be held on Tuesday, May 7, at 8 p.m., when a paper will be read by Mr H. T. Kempton "On Sympathetic Nervous Affections connected with the Teeth." W. Perkins, Esq., will preside on the occasion.

ELECTION OF MEMBERS.—At meetings of Council held on Tuesday evenings, April the 2nd and 16th, the following gentlemen were elected Members and Associates of the College: *Members*—Messrs John Durander, Everton, Liverpool, and Denis William Ransom, Pembroke place, Liverpool. *Associates*—Messrs R. Belsey, Borough road, Southwark, and Henry Faro, Westbourne grove, Bayswater.

Meeting of Examiners.—At a meeting of the Court of Examiners, held on Thursday, April 11, the following gentlemen were admitted members of the College of Dentists by examination: Messrs Nathaniel Gilbert Cox, of Antigua, West Indies; George Henry, of Wimpole street, Cavendish square; and Frederiek Alexander Huet, of Darlington street, Wolverhampton.

Lectures.—On Tuesday evening, May 14, Dr Richardson will commence a Course of Three Lectures on "The Salivary Glands and Saliva—including the Anatomy, Physiology, and Diseased Conditions of the Salivary System." Members and Associates of the College may obtain tickets for their friends upon application to the Honorary Secretaries at the College.

Metropolitan School of Dental Science.—The class for the study of Practical Chemistry, under the superintendence of Dr Bernays, will meet on Friday, May 3, at 7 p.m., and every succeeding Friday during the months of May, June, and July, at the same hour. Fee for attendance, 2*l.* 2s. Members and Associates of the College, and Students of the School, are privileged to attend this class at half fees.

METROPOLITAN SCHOOL OF DENTAL SCIENCE.

CONVERSAZIONE AND DISTRIBUTION OF SCHOOL PRIZES.

The Annual Distribution of Prizes took place at the College of Dentists, Cavendish square, on Wednesday evening, April 10th. The company was numerous, including a large number of ladies, and the proceedings were unusually animated. Alexander Mackinnon, Esq., M.P., F.R.S., presided.

The Chairman said that although he so often had the honour of addressing the House of Commons, he could assure the ladies and gentlemen present that he felt more diffidence in addressing them than ever he had done when making a speech in the presence of five hundred members of the House of Commons on any common matter of business. Fully aware, as he was, of the importance of the Institution, and of the advantages arising from it to mankind in general, he felt highly gratified in being Chairman on so interesting an occasion as the present. He believed that the Metropolitan School of Dental Science was the first Institution of the kind that had been established in this country, and probably in Europe. It would indeed be hard, at a time when civilisation was extending itself throughout the world, if Englishmen did not keep pace with that progress in science, by promoting, as far as possible, the important branch of science in connection with which they were assembled at present. (Applause.) When it was considered what great advantages arose to the community at large from Dental Science, it would be seen that it was the interest, the inclination, and the duty of all to promote its culture in every possible way. Besides the important functions performed by the teeth in mastication, a good set of teeth added much to the beauty and expression of the countenance, and particularly so in the fair sex. (Applause.) It had been observed—and he thought with great truth—that a lady who possessed fine eyes and good teeth must have a pleasing appearance. (Cheers and laughter.) That being the case, and considering that we were the most civilised nation in the world, and, moreover, that we had the good fortune—and he might well say this with respect to the ladies present—that we had the good fortune to possess the finest women in the world—(loud applause),—he thought the Dental Profession had special claims on the support of the people of England. After some further remarks, the Chairman called upon the Hon. Secretary to read the Report.

Mr **Kempton** then read the Report as follows:

The Faculty of Lecturers, in presenting the Report of the Second Session of the "Metropolitan School of Dental Science," have pleasure in being enabled to record the continued progress and success of the Institution.

In the course of the past session eight additional entries have been made to the various classes. Several of the gentlemen who have entered are already in Dental practice, their object in joining the classes being to qualify themselves for the examination for membership of the College of Dentists. This fact demonstrates the necessity and advantage of the School.

The subjects and arrangements of the lectures have been the same as during the previous session, the result of the last examination of the pupils having fully testified to the efficiency of the plan and course of study which had been adopted. A new feature will, however, be introduced during the present summer by the formation of a class of Practical Chemistry. The School is greatly indebted to Dr Bernays for having promoted so important an addition to the present course of study, and it is gratifying to the Lecturers to know that his suggestion has been promptly responded to by the students, by whom, indeed, the movement was in some measure initiated. The class will meet once a week during the months of May, June, and July. The conduct of this class has been undertaken by Mr Tribe, the able and talented assistant of Dr Bernays. Mr Tribe's intimate acquaintance with the details of the laboratory is a sufficient guarantee that the course will be of a thoroughly practical character.

At the formation of the School, it was intended to make arrangements by which the students would have the opportunity of entering to a course of Dental practice: unforeseen difficulties and impediments have hitherto prevented the carrying out in a satisfactory manner this important and essential feature of Dental education. To remedy this defect, a Committee is being formed for the express purpose of founding a Dental Hospital or Dispensary. The promises of support already received warrant the expectation that such an Institution will be fully organised and in working order by the commencement of the ensuing session. With this addition to the existing arrangements of the School, the Lecturers believe that it will contain every requisite for imparting a sound practical knowledge of Dental Science to the student, and will be the means of largely increasing the prosperity of the School. It is confidently anticipated that all who are in any way interested either in the establishment of an independent Dental Institution, or in the progress of Dental education, will lend their support to the Committee in the formation of the proposed Hospital.

As on the former occasion, the prizes are of two kinds,—those given by the Lecturers in their respective classes, and those awarded by the

Council of the College of Dentists. Last year the Council gave a gold and silver medal,—the first for general proficiency in all subjects taught in the School, the second for mechanical dentistry: this year, in addition to these medals, a second silver medal has been given for operative dentistry.

The examination for the gold medal was conducted by the Lecturers and the Council conjointly, and was only obtained by Mr Cox after a long and strict oral examination in competition with Mr Henry, a gentleman who has distinguished himself in the other examinations, and to whom the Council have considered it to be only an act of duty to present a certificate of honour.

The silver medal for operative dentistry (gained by Mr Wood) was competed for in the presence of three members of the Council, and upon their recommendation the Council have been induced to depart from their original intention of only awarding the one prize, and they have, in accordance with such recommendation, awarded to Mr Cunningham an honorary certificate.

The Faculty have to express their regret that in mechanical dentistry there was no competition; at the same time, they are happy to be able to speak in the highest terms of the piece of work for which Mr Wood obtained the medal, a distinction which he fully merited. The Council desire it to be understood that on all occasions, whether there is only one or whether there are several candidates, the medals will not be awarded unless the candidates exhibit a high standard of efficiency. It is intended that the possession of these medals should imply, not merely a relative superiority over the unsuccessful candidates, but also a positive amount of excellence in those who obtain them, and thus become a guarantee of their skill and ability in the department for which the medal was awarded.

The Lecturers avail themselves of this opportunity to express their grateful appreciation of the indefatigable labours of Mr Schofield, whose knowledge of anatomy is only equalled by his happy mode of imparting it to others.

The Lecturers have pleasure in reporting favourably of the diligence and attention of the students generally; and it only remains for them to thank the President and Council of the College of Dentists for the use of the rooms and for the support which they have given to the School, the prosperity of which has no doubt been greatly owing to the interest they have uniformly taken in its welfare. The Lecturers venture, however, to hope that the benefits are in some measure mutual, the welfare of the College being intimately associated with that of the School, and the movements of the two bodies forming one and the same attempt for the establishment of an independent Dental Institution.

The prizes were then awarded as follows, viz.:

The Rymer Gold Medal for General Proficiency—Mr N. G. Cox.

Silver Medal for Proficiency in Operative Dentistry—Mr J. W. Wood.

Silver Medal for Proficiency in Mechanical Dentistry—Mr J. W. Wood.

Certificates of Honour were also awarded for General Proficiency to Mr G. Henry, and for Proficiency in Operative Dentistry to Mr Cunningham.

CLASS PRIZES.

Anatomy and Physiology—Senior prize, W. F. Vernon; Junior prize, N. G. Cox; Certificate of Honour, G. Henry.

Principles of Surgery—1st prize, G. Henry; Certificate of Honour, N. G. Cox.

Dental Surgery—1st prize, G. Henry; 2nd prize, N. G. Cox; Certificate of Honour, W. F. Vernon.

Dental Mechanics—1st prize, N. G. Cox; Certificate of Honour, G. Henry.

Chemistry and Metallurgy—1st prize, N. G. Cox; Certificates of Honour, G. Henry and William Bradley.

Comparative Anatomy—1st prize, N. G. Cox; Certificates of Honour, G. Henry, W. Bradley, and W. F. Vernon.

Mr Waite, in presenting Mr Cox for the Gold Medal for General Proficiency, said: Mr Cox, I have great pleasure in presenting you to our hon. Chairman, that you may receive at his hands this gold medal. You richly merit it, for the examination in which you successfully competed was one of no trivial kind. It embraced a long range of science, and in each of the various subjects you acquitted yourself in the most creditable manner to yourself and your College. We hope that, flushed with this first burst of success, you will not relax your exertions in the onward path of science, but that you will increase in knowledge, and be an honour to this College and a comfort to every one connected with you. (Applause.)

The Chairman: Mr Cox, on behalf of the College I present you with this medal, and I cannot help saying that I consider your position at this moment to be a most enviable one. You have obtained that reward which amongst the Romans was thought the greatest possible honour a human being could receive from his fellow-subject—the approbation, the civic crown, the admiration of his fellow-countrymen. On behalf of your College, let me express a wish that in future years, by further successes in the path of science, you will fulfil the expectations you have now raised. I present you with this medal, which I trust will only stimulate you to further exertions.

Mr Henry was then called to receive the Certificate of Honour for General Proficiency.

Mr Waite, in presenting Mr Henry to the Chairman, said that although he had not obtained the gold medal, he had richly deserved it, having been within two marks of Mr Cox, the successful competitor.

The Chairman, in an appropriate speech, presented Mr Henry with the Certificate of Honour.

Mr Robinson, in presenting Mr Wood to the Chairman to receive the Silver Medal for Proficiency in Operative Dentistry, said he wished to impress on Mr Wood that the result of his receiving that medal must not be to render him satisfied with his present attainments, but that, on the contrary, it ought to act as a stimulus to still further zeal and assiduity in the prosecution of his professional studies. (Applause.)

Mr Cunningham not being present, was presented by proxy with a Certificate of Honour for his great proficiency in Operative Dentistry.

Mr Wood was next called to receive the Silver Medal for Mechanical Dentistry.

Mr Rymer said that, in connection with this prize medal, he could not help remarking that although, as the Report had stated, no prize would be awarded unless positive merit was shown, yet, and after due consideration, the medal had been awarded to Mr Wood, because it was clearly apparent that he entirely deserved it. He (Mr R.) felt some regret that there had been no competition offered in this important branch of Dental Science. At the same time, he had little doubt that even had there been other competitors, Mr Wood would still have occupied the proud position he now held. This branch of the Profession was second to none, and students would do well to attend to it, for success in a Profession was only to be attained by those who understood every part of it. (Applause.)

The CHAIRMAN then presented Mr Wood with the silver medal, conveying to him at the same time his wish that he might be stimulated by his success to those exertions which would give him the position in his profession for which he had shown himself so well qualified.

Dr RICHARDSON then said that the special prizes of the College having been distributed, it was customary to present the class prizes. Last year Mr Vernon had competed for the prize for Anatomy and Physiology, and was unsuccessful. In the present year's examination, however, he had come off victorious. Mr Vernon's attention to his classes deserved great praise. He (Dr Richardson) had great pleasure in presenting him with a book which to him was doubly dear, having been the all-but-dying work of a man who by his own exertions rose to be one of the greatest modern philosophers in medicine, the late Dr Snow.

In presenting Mr Cox with the Junior prize, Dr RICHARDSON said the success attained by Mr Cox was a notable instance of the superiority of the voluntary system of attendance to Lectures, &c., pursued in the Dental School, as compared with the strict disciplinarian systems of other Schools of Medicine. He could state most distinctly that in all his career as a teacher, he had never known a prize so well attained as that which had been attained by Mr Cox.

The CHAIRMAN, in a few appropriate remarks, presented Mr Cox with the second prize.

Mr George Henry was then presented with the Certificate of Honour; in relation to which Dr RICHARDSON said, Mr Henry's papers were only second to Mr Cox's by two marks. He had been a long time wavering as to whether he should give Mr Henry a second prize, and he hoped that next year Mr Henry would attain the proud position now occupied by Mr Vernon.

Mr Henry was next presented with the first prize in Principles of Surgery.

In connection with this class, Mr SPENCER WELLS said, the attendance and competition for the honours had equalled anything he had ever seen in any Medical School. Mr Henry had, in the Surgery Class, certainly distanced his competitors, and won, he might almost say, in a canter. (Laughter.) Nevertheless, those who followed had also shown great ability, and to Mr Cox he had great pleasure in awarding a Certificate of Honour.

Mr HULME, in presenting two prizes which he had awarded in the class of Dental Surgery, the first to Mr Henry, the second to Mr Cox, stated that both these gentlemen had succeeded in surpassing all the other competitors in that subject: he had, however, no difficulty in drawing a distinction between the successful candidates. The first prize consisted of Mr Tomes' Lectures on Dental Surgery; the second, of Dr Richardson's work on Diseases of the Teeth. He could not help remarking that the latter work, although not dealing with the details of Operative Dentistry, was the most comprehensive work that had been published on the general principles of diseases relating to the teeth. The work had been highly commended both in this country and in America, and had added to the reputation which Dr Richardson had previously achieved. The answers which Messrs Henry and Cox had given to the questions in Dental Surgery were highly satisfactory, and any one who read them would be convinced that these gentlemen were thoroughly conversant with the subject. To Mr Vernon he had awarded a certificate of honour, and he was happy to be able to report favourably of the assiduity and attention which the gentlemen belonging to his class had exhibited during the Session.

The prize for Dental Mechanics was then awarded to Mr Cox. In reference to this award, Mr PERKINS said that the secret of Mr Cox's success was the hard work which he had bestowed upon all his studies. It would always be found that success depended as much upon the application as upon the genius of the competitors.

Mr Henry received the Certificate of Honour in Dental Mechanics.

Dr BERNAYS, in speaking of the students of his class on presentation of the Chemistry prizes, said that he entirely concurred with the opinion expressed by his colleagues that the attendance of the Students of the Metropolitan School of Dental Science was not surpassed by the attendance in any other place where he had ever taught. He had the advantage of being the last speaker, and was able therefore to be very brief, for those who had preceded him had expressed his own views. He must add, however, that the gentlemen to whom the Chairman was now about to present the prizes had earned the rewards by the most fair competition, the examination having been conducted in writing, and the papers sent in under a sealed envelope, and until that evening he did not know who were the successful competitors.

The prize for Chemistry and Metallurgy was then awarded to Mr Nathaniel G. Cox; Certificates to Mr Henry and Mr William Bradley.

To Mr Cox was also awarded Dr Cobbold's prize in Comparative Anatomy; and Certificates to Mr Henry, Mr Vernon, and Mr Bradley.

Mr Cox said he had great pleasure in proposing on behalf of his fellow-students and himself a vote of thanks to the Lecturers of the School. In doing so, he had to say that they had imparted instruction in a way that had made the pursuit of knowledge the pursuit of pleasure—(cheers)—and had displayed those qualities of heart and mind which had won the regard of their pupils generally. (Loud applause.)

Mr HENRY said he had great pleasure in seconding the vote of thanks. It was with a full heart that he embraced this opportunity of thanking all the Lecturers again for their liberal, clear, useful, and invaluable Courses of Lectures, which must have been so great an assistance to their pupils, and facilitated their studies so much. The high position held by the Lecturers in their profession must serve to excite in the students a wish to emulate their teachers, and one day to attain similarly honourable positions. He trusted that the day would come when the heads of the College—the fathers of the Profession—would look down on their pupils with pride. He did not speak thus from partiality, or because he was one of the successful students, but because he felt that these were the heartfelt sentiments of the School generally. (Applause.)

Carried by acclamation.

Mr VERNON proposed a vote of thanks to Mr Schofield, Demonstrator of Anatomy, which was unanimously accorded, and briefly responded to by Mr Schofield.

Mr HENRY, in a few brief and appropriate remarks, proposed a vote of thanks to Mr Kempton for his kindness and attention to the students during the past Session.

Mr KEMPTON, in reply, begged sincerely to thank them for the honour thus conferred upon him, and to assure them that the work to him was a labour of love, and the result of that evening amply rewarded him for his humble services. The duties which he had to perform were so replete with interest, that he considered himself most fortunate in having been officially engaged in the establishment of one of the most important movements in the Dental Profession, and he hoped above all things, in connection with the School, that the Students would be true to themselves, to their Lecturers, and to the independent principle on which that School was founded; that, like the true British sailor who nails his colours to the mast determined to win the battle, they might find in the men who belong to the Metropolitan School of Dental Science and the College of Dentists of England that courage and perseverance which invariably meet with their reward. (Applause.)

On the motion of Mr Spencer Wells, seconded by Mr Robinson, a vote of thanks was unanimously passed to the Chairman; which having been suitably acknowledged, a similar compliment was proposed by Mr Kempton to "the Ladies" for their attendance, and the company then separated to view the various works of art which had been collected together for their inspection.

On the walls of the College were displayed Paintings, Water-colour drawings, Engravings, and Photographs, kindly lent by Messrs Page, Rolfe, Gritten, Kempton, Vidler, Sharpe, Radclyffe, and Whymper. The magnificent collection of Gold and Silver plate exhibited by Messrs Garrard and Co., of the Haymarket, called forth universal admiration; as did also the works of art in Parian and China, contributed by Messrs Copeland of Bond street.

Some beautiful groups in Parian, designed by Mr Beattie of Newman street, and forwarded from the studio of that gentleman, were much admired.

Through the kind assistance of Mr France, of the firm of Attenborough, Piccadilly, the small lecture-room was exclusively devoted to the exhibition of rare and valuable specimens in Dresden and old Chelsea china; Vases in terra-cotta, by Wedgwood, designed by Flaxman; Antique cups, Carvings in ivory, &c.; and on the walls were displayed some rare and valuable paintings of the Old Masters.

The other exhibitors were the London Stereoscopic Company, Mr Haseldine of Coventry street (antique clock and candelabras), and Mr Perry, of Piccadilly (a collection of photographic portraits painted in imitation of ivory).

Refreshments were served in the picture-gallery of the Polytechnic Institution, which had been specially set apart for the occasion. The company separated shortly before eleven o'clock, highly gratified with this, certainly, one of the most successful meetings held within the walls of the College.

MISCELLANEOUS.

HOW HUNTER WORKED.—Hunter, at his death, left nine folio volumes of Dissections of Animals. These were copied by Mr Clift, and are now published in the second of Professor Owen's volumes. This extraordinary accumulation of 'Observations on Comparative Anatomy,' as they are called in the table of contents, covers no less than 490 pages. It includes dissections of almost every type of animal, from the highest vertebrate to the Tubipora musica. A superficial glance at these memoranda gives, as it were, a great deal of the secret history of the great Museum. Throughout are traces of the incessant purchases made by Hunter of everything curious or useful that came in his way. We get glimpses at his associates and fellow-workers, and have laid open to us the sources of the supply of his collection. Lord Shelburn, then prime minister, sends him a large black monkey of the spider kind, of which the cranium, the kidney, the tongue, larynx, and the external ear still remain. Dr Afzelius, a pupil of Linnæus, brings him home from Sierra Leone a young chimpanzee. He made preparations of the various parts of this creature, but, as its structure had already been described by another anatomist, he appears not to have recorded the results of his own dissection. One day he receives the following note :—"If you will step in at Banks's in Soho square, you will find the corpse of the fine Sierra Leone cat, the inside of which is at your service. The skin is to be stuffed for the British Museum." On another, some one at the Tower sends him a brownish dun cat, something like the shargoss ; and then he goes to Mr Brookes's, a dealer in rare animals, and father of the lecturer Joshua Brookes, to see a civet cat dissected, and comes away with a short memorandum about the direction of the opening of the pupil, satisfied that the anatomy was similar to that of the common cat. Again, there arrive two young hyænas from Gibraltar, with a note of introduction, assuring him "You need not be afraid of them ; for, in spite of what authors say, they are as tame as puppies." Nevertheless, they fought together and died, were injected and dissected. Jenner, one of his house pupils—the Jenner—sends him a young whale from Gloucester, and he gets an old black bear that had lost its teeth, from a Mr Gough, a dealer in animals on Holborn hill. The Duke of Portland supplies a pigmy musk deer, of which he preserves the skeleton, now No. 3499 in the osteological series. Dr Solander presents a white bear from Norway, Mr Banks a questionable creature from Africa with the sobriquet of "Nick," and Mr Clarke, probably the founder of Exeter Change, gives credit for a spotted cavy. He is puzzled about the copulation of beavers, and hunts up specimens that he may inject the penis, and so produce artificial erection. He finds time to dissect a Portuguese bittern, which, he says, "I shot when crossing the Tagus," and he makes a marginal drawing in his note-book, to show some peculiarity of its stomach. Even this organ, picked up by the wayside, is taken care of, and years after gets set up in the Museum. In 1764 he buys a crocodile, which had been in a show for several years in London before it died, and takes care to send for Hewson to see it anatomised, and to hear an account of a previous dissection. The intention of this was that Hewson might see that "I had a tolerable description of the absorbents in the Amphibia, because I found him busy in the pursuit of this system in various animals, and hinting himself to be the discoverer of it even in birds, and to convince him that this description must have been written some considerable time before. Mr Hewson at the time appeared satisfied, or, at least, made no remarks." An antelope comes from the Queen, and royalises the question.—'Medical Times and Gazette.'

NOTICES TO READERS AND CORRESPONDENTS.

All communications intended for insertion in this Journal must be authenticated by the name and address of the writer, not necessarily for publication, but as a guarantee of good faith.

Contributors are requested to be so obliging as to write legibly, and on one side of the paper only.

BOOKS RECEIVED IN EXCHANGE.

The Dental Cosmos for April.
The Dental Register of the West for April.
The Pharmaceutical Journal for April.

THE
DENTAL REVIEW.

JUNE, 1861.

THE NATURAL HISTORY OF THE HUMAN TEETH.

By JOHN HUNTER, F.R.S.

EDITED BY

FRANCIS C. WEBB, M.D. Edin., F.L.S., F.S.A.,
Member of the Royal College of Physicians of London; Physician to the Great Northern Hospital, &c.

(Continued from page 200.)

OF THE BONY PART OF A TOOTH.

The other substance of which a Tooth is composed, is bony; but much harder than the most compact part of bones in general. (*g*)

(*g*) [In the following description of the minute structure of dentine (termed, in the text, the bony part of a tooth), the account given by Kölliker has been principally although not solely followed:

The *dentine*, *ivory*, *substantia eburnea*, *ebur*, is of a yellowish white colour, and appears in the fresh specimen to a certain extent transparent or translucent. In the dried tooth it is white, and has a silky lustre, from the circumstance that it is permeated in every part of its substance by a series of microscopic tubes which, in that condition, contain air. It consists of a matrix and of the tubes just mentioned, *dentinal tubules*, *dental canals*, *canaliculi dentium*. The dentine alone bounds the pulp cavity, with the exception of a small place at the root; and in the uninjured tooth it is never exposed, being covered everywhere by enamel or cement. The matrix is perfectly homogeneous, showing, according to Kölliker, no trace of organised structure. The dentinal canals measure in width 0·0006‴ to 0·001‴, some of those at the root 0·002‴: they commence by open mouths at the pulp cavity, and proceed outwards throughout the entire thickness of the tissue. Each canal appears to have a special wall in the shape of a yellowish ring, which is generally visible when the tubes are transversely divided. Kölliker believes, however, that the yellowish ring surrounding the tube is not to be considered as the real wall. "The apparent walls," he writes, "of the dentinal tubes, which are usually seen upon the transverse sections, are not the true walls of the canals, but rings, the appearance of which arises from this, that a certain length of the canals is always seen with

This substance makes the interior part of the body, the neck, and the whole of the root of a Tooth. It is a mixture of two

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the microscope in the thickness of the section, never sufficiently fine to obviate this effect; and the short tubular segments being curved in direction, a greater apparent thickness is thus given to the walls than they really possess. If, upon a transverse section, the openings of the canals be brought accurately into focus, we perceive, instead of a dark ring, only a yellowish, very narrow edge; and it is this that I regard as being the true wall." (1) During life, the canals are generally believed to be permeated by a clear, pellucid fluid; in the dried state, they become filled with air, and appear as dark lines by transmitted, and shining filaments by reflected light. The dentinal tubes undulate in their course; they present two or three larger flexures, and a great number of smaller ones—according to Retzius as many as 200 in a line. As they proceed outwards, they divide, branch, and anastomose. The divisions, which are frequent near the origin of the tubes, are generally dichotomous; they may be repeated from two to five times or more—so that one tube may form four, eight, or sixteen tubes. Their calibre becomes diminished by division; and they run in a nearly parallel manner, and close together towards the surface of the dentine. In the crown of the tooth, the dental tubes, at about the middle or outer third of their course, commence sending off fine ramifications, which are mostly simple, but sometimes branched. In this situation, a tube will frequently appear to terminate by dividing into two fine branches. In the fang, the ramifications are much more numerous than in the crown; they commence earlier in the course of the tube, and sometimes give it a plumose, or, when the ramifications are long and branched, a brush-like appearance. These ramifications, by anastomosing, serve to connect with each other neighbouring or more remote canals. The terminations of the dentinal tubes are fine in proportion to their amount of ramification; they frequently appear as extremely delicate pale lines, like the fibrils of connective tissue, and become at length so attenuated that they cannot be farther traced. Where, however, the tubes and their ramifications can be followed to their termination, they are either found to form loops in the substance of the dentine itself by the junction of one tubule with another (*terminal loops of the dental canals*), or to end in a granular layer to be hereafter noticed;—or, passing across the boundary of the dentine, they may be traced into the enamel or crusta petrosa. (2)

Dentine presents indications of lamellation. In a longitudinal section of a tooth, arched lines more or less parallel to the circumference of the crown, and situated at a varying distance from each other, are to be observed. In transverse sections they appear as rings. These are the *contour lines* of Professor Owen; so called from their general similarity with the contour of the tooth. Mr Salter, who has described their appearance and arrangement with great minuteness, states, however, that the course of the contour line never exactly corresponds with the circumference of the crown of the tooth. "The contour of the two," substances, viz. calcarious earth and an animal substance, which we might suppose to be organized and vascular. The earth is

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(1) Kölliker, op. cit., p. 292.
(2) *Vide* Kölliker, op. cit., p. 291.

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he writes, "is not identical, for the markings (in whatever part examined) are more divergent than the outline of the tooth, and, passing from within outwards, abut in succession upon the external surface of the dentine. In comparing the absolute contour of any tooth, it will be found that the angle formed by its sides is more acute at its summit, or the summit of any particular cusp, than the contour markings within." (1) In teeth which have more than one cusp, the upper contour markings are confined to their own cusps, and their extremities abut against their sides; the lower ones are continuous with those of continuous cusps. These contour lines or markings are curved in their course; according to the observer just quoted, the curves are "in proportion to the primary curves of the dentinal tubes at any particular spot, and cross them at right angles." (2) These lines vary in human teeth in intensity and in number. In the teeth of some animals they present a beautiful appearance; especially is this the case in some of the Cetacea and Pachydermata, and in the Walrus. A tendency to break into lamellæ is not unfrequently found in fossil teeth, and is sometimes noticed in fresh human teeth and in tooth cartilage. In the human tooth, the extremities of the better defined contour lines terminate in irregularly-shaped cavities (*interglobular spaces*, Czermak), situated at the surface of the dentine, immediately within the cement and enamel. Mr Salter describes these spaces or cavities as being more or less club-shaped, with the butt end of the club towards the surface, and the pointed or attenuated end stretching obliquely inwards and upwards towards the pulp cavity. They vary in size; their walls are formed by spherical masses or globules of dentine, which project into the cavity; and they are traversed by the dentinal canals, the number of which will vary with the size of the cavity. The dental canals permeate the dentine globules, five or six traversing a large globule: in the dried specimen, when the cavity contains air, the individual tubules may be traced from one globule to another, skipping, so to speak, the interglobular space. Kölliker asserts that, during life, the spaces are filled with a soft substance resembling tooth cartilage, which is permeated by the tubules. He says that this soft substance "offers more resistance to hydrochloric acid than the matrix of the true ossified tooth, and on this account can be isolated exactly like the dentinal tubes." (3) In the smaller spaces, the spherical character of the tissue composing the walls is not so apparent; the cavity has a more jagged outline, and resembles in appearance a lacuna of bone, the more so as it is traversed by the dentinal canals. In the fang, these smaller interglobular spaces and globules constitute what has been termed the 'granular layer' by Tomes. (4) True lacunæ have been rarely seen by Kölliker in dentine, and never at a distance from the cement boundary. Interglobular spaces and globules sometimes occur in the in very considerable quantity; it remains of the same shape after calcination, so that it is in some measure kept together by

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(1) On certain Appearances occurring in Dentine, by S. J. A. Salter, Quart. Journ. Micros. Sci., vol. i., p. 254.

(2) Op. cit., p. 255.

(3) Kölliker, op. cit., p. 294.

(4) Tomes, Lectures on Dental Physiology and Surgery, p. 48.

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interior of the dentine of the fangs; and on the surface of the pulp cavity, the projecting spheres of dentine may produce irregularities or stalactite-like formations, visible to the naked eye. In many teeth, the interglobular spaces are absent, or but little marked: they are always most conspicuous in those specimens in which the enamel exhibits irregular development, and there appears to be a relation between the contour markings in the dentine and the grooves and irregularities in the enamel. (1) In connection with this condition, also, Czermak has pointed out the existence of opaque white lines, forming rings round the fang: they are, of course, abnormal, and vary in breadth from the 1-50th to the 1-100th of an inch. The existence of the contour lines has been explained by referring them to the darker appearance produced by a series of secondary curves in successive dentinal tubes, or by a widening of those tubes; but it appears more probable that they are due, for the most part, to the same cause which has produced the interspaces and the globular condition of the dentine—viz., to the mode in which the animal material of dentine is calcified, and to occasional arrests in the process. Mr Salter observes that the contour markings, as well as the fracture lines, which readily occur in the intermediate normal dentine, and are parallel to them, exactly correspond to the pulp surface in the progressive formation of the dentine—are identical, in fact, with the juncture line of the pulp and internal dentine surface at any particular time of growth. The existence of interglobular spaces and persistent globules may be, with high probability, attributed to arrest at various times in the process of calcification. The observations of Czermak led him to the fact that the organic material of dentine is, during the process of calcification, impregnated with earthy salts in globular forms; and that, by a deeper process of calcific impregnation, the whole tissue is imbued with the hardening element, and the globules are fused. It is easy, therefore, by supposing a temporary interference with this process from some constitutional cause, to account for the appearances we have been describing. (2) Some light is, perhaps, thrown on the process of calcification by some observations of Mr Rainie, quoted in Mr Tomes's 'System of Dental Surgery:' "Mr Rainie finds, that if carbonate of lime is formed in a thick solution of mucilage or albumen by the decomposition of carbonate of soda or potash, the newly-formed salt takes a globular instead of a crystalline form. The globules produced are composed, however, not only of carbonate of lime, but also of a certain portion of mucilage or albumen in which the combination has taken place." Phosphate of lime, if produced under similar circumstances, supposing a small proportion of carbonate of lime be present, will also assume the globular form. The globules are laminated, and increase by the addition of new layers on the surface; and if two or more globules are in contact, they become fused into one laminated mass by the union of the laminæ which are in contact. "The globules themselves have been produced by the coalescence of smaller masses, which again are cohesion; and it is capable of being extracted by steeping in the muriatic, and some other acids. The animal substance,

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(1) Salter, op. cit., p. 253.

(2) *Vide* Salter, op. cit.

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made up of still smaller spherules of similar material, the individuality of the constituent bodies being ultimately lost in the uniform fusion of the whole into one compact mass." "In the discovery of the substitution of the globular for the crystalline form of these two salts of lime, Mr Rainie considers he has found an explanation of the process of calcification, not only of bone and teeth, but also of the formation of shells." (1) In many teeth, the original dentine globules are indicated by faintly-traced arched lines; but the more perfectly calcified the tooth, the more completely will fusion have taken place.

The dentinal canals are generally held to be permeated during life by a nutrient fluid. Mr Tomes, however, has announced the discovery that each dentinal tube is permanently tenanted by a soft fibril, which passes from the pulp into the tube, and follows its ramifications. The dentinal fibril he describes as consisting of an almost structureless tissue, transparent, and of a comparatively low refractive power. He has not hitherto been able to determine whether they are tubular or solid. "In some cases," he writes, "there is an appearance of tubularity; but, being cylindrical, this may be a mere optical effect. When accidentally stretched between two fragments of dentine, the diameter of the fibril becomes much diminished; and when broken across, a minute globule of transparent but dense fluid may sometimes be seen at the broken end, gathered into a more or less spherical form." These appearances may lead to the surmise that the fibril, like the white fibrillæ of nerves, consists of a sheath containing a semi-fluid matter; but such a conclusion is not to be accepted without farther evidence. Mr Tomes is unable to state the manner in which the fibrils he describes are connected with the pulp. He has traced them for a short distance into its substance, but at present cannot decide whether they terminate in cells, or are in any way connected with the nerves of the pulp. Although he does not take upon himself to affirm that these fibrils are of the nature of nerves, he yet regards them as the means by which sensibility is communicated to the dentine (2). These observations are highly interesting and important, but at present they require confirmation.

Nasmyth took a different view of the structure of dentine. From his observations, he was led to deny the existence of the dentinal tubuli. He believed that "the so-called tube was in reality a solid fibre, composed of a series of little masses succeeding each other in a linear direction, like so many beads collected on a string." The matrix—or, as he terms it, inter-fibrous substance—he describes as being originally cellular in composition; and he maintains that the baccated fibres are, in fact, rows of persistent nuclei belonging to the cells of which the inter-fibrous substance is composed (3). His observations have not, however, been confirmed by those of any other writer on the dental tissues.

Dentine exhibiting Haversian canals (the vaso-dentine of Owen) is very rarely seen in Man, although it occurs in many animals. The when deprived of the earthy part, by steeping in an acid, is more compact than the same substance in other bones, but still is soft and flexible. (*r*)

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(1) Tomes's System of Dental Surgery, pp. 298, 299.
(2) Tomes, op. cit., pp. 282-288.
(3) Nasmyth, Researches, pp. 93, 94.

That part of a Tooth which is bony, is nearly of the same form as a complete Tooth; and thence, when the Enamel is removed, it has the same sort of edge, point, or points, as when the Enamel remained. We cannot by injection prove that the bony part of a Tooth is vascular: but from some circumstances it would appear that it is so; for the Fangs of Teeth are liable to swellings, (*s*) seemingly of the spina ventosa kind, like other bones; and they sometimes anchylose with the socket by bony and inflexible continuity, as all other contiguous bones are apt to do. (*t*) But there may be a deception here, for the swelling

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dentine which is produced in cases of obliteration of the pulp cavity may, however, exhibit a few Haversian canals, and rounded cavities resembling *lacunæ:* this has been described by Prof. Owen under the name of *osteo-dentine.* (1)]

(*r*) [The organic basis of dentine (tooth cartilage) is identical chemically with that of bone: it is, by boiling, readily converted into gelatine. When separated by treating dentine with hydrochloric acid, it retains not only the form, but the internal structure of the tissue: the tubes, however, are not so easily visible. Kölliker states that if tooth cartilage "be macerated in acids or alkalies until it is quite soft, the matrix is found in the act of disintegration; but the dentinal tubes, with their walls, are still preserved, and may be isolated in large quantities." The tubes may also be isolated after long-continued boiling. By prolonged maceration in acids or alkalies, the whole of the organic basis is dissolved.

The following is the chemical composition of dentine according to Von Bibra: (2)

	Molar Tooth of a Man.
Phosphate of Lime and some Fluoride of Calcium	66·72
Carbonate of Lime	3·36
Phosphate of Magnesia	1·08
Salts	0·83
Cartilage	27·61
Fat	0·40
	100·00
Organic Substances	28·01
Inorganic Substances	71·99]

(*s*) [Exostosis of the fang, produced by hypertrophy of the cement.]

(*t*) [Mr Tomes states that "although numerous instances may be may be an original formation, and the anchylosis may be from the pulp that the Tooth is formed upon being united with the socket. The following considerations would seem to shew that the Teeth are not vascular: first, I never saw them injected in any preparation, nor could I ever succeed in any attempt to inject them, either in young or old subjects; and therefore believe that there must have been some fallacy in the cases where they have been said to be injected. Secondly, we are not able to trace any vessels going from the pulp into the substance of the new-formed Tooth; and whatever part of a Tooth is formed, it is always completely formed, which is not the case with other bones. But what is a more convincing proof, is reasoning from the analogy between them and other bones, when the animal has been fed with madder. Take a young animal, viz. a pig, and feed it with madder, for three or four weeks; then kill the animal, and upon examination you will find the following appearance: first, if this animal had some parts of its Teeth formed before the feeding with madder, those parts will be known by their remaining of this natural colour; but such parts of the Teeth as were formed while the animal was taking the madder, will be found to be of a red colour. This shews, that it is only those parts that were forming while the animal was taking the madder that are dyed; for what were already formed will not be found in the least tinged. This is different in all other bones; for we know that any part of a bone which is already formed, is capable of being dyed with madder, though not so fast as the part that is forming; therefore as we know that all other bones when formed are vascular, and are thence susceptible of the dye, we may readily suppose that the Teeth are not vascular, because they are not susceptible of it after being once formed. But we shall carry this still farther; if you feed a pig with madder for some time, and then leave it off for a considerable time before you kill the animal, you will find the above appearances still subsisting, with this addition, that all the parts of the Teeth which were formed after leaving off feeding with the madder will be white. Here

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(1) *Vide* Kölliker, op. et loc. cit.

(2) Kölliker, op. cit., p. 292.

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found where two teeth become united by cementum developed under circumstances which constitute its formation a disease, yet in no well-authenticated instance has the cementum become continuous with the bone of the socket." (1) He believes in the existence of a law which prohibits the union of the tooth to the jaw in Man. Anchylosis of the teeth to the jaw is the normal condition in reptiles.]

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(1) Tomes, op. cit., p. 445.

then in some Teeth we shall have white, then red, and then white again; and so we shall have the red and the white colour alternately through the whole Tooth.

This experiment shews, that the Tooth once tinged, does not lose its colour; now as all other bones that have been once tinged lose their colour in time, when the animal leaves off feeding with madder (though very slowly), and as that dye must be taken into the constitution by the absorbents, it would seem that the Teeth are without absorbents, as well as other vessels.

This shews that the growth of the Teeth is very different from that of other bones. Bones begin at a point, and shoot out at their surface; and the part that seems already formed, is not in reality so, for it is forming every day by having new matter thrown into it, till the whole substance is complete; and even then it is constantly changing its matter.

Another circumstance in which Teeth seem different from bone, and a strong circumstance in support of their having no circulation in them, is that they never change by age, and seem never to undergo any alteration, when completely formed, but by abrasion; they do not grow softer, like the other bones, as we find in some cases, where the whole earthy matter of the bones has been taken into the constitution.

From these experiments it would appear, that the Teeth are to be considered as extraneous bodies, with respect to a circulation through their substance; (*u*) but they have most certainly a living principle, by which means they make part of the body, and are capable of uniting with any part of a living body; as will be explained hereafter: and it is to be observed, that affections of the whole body have less influence upon the Teeth than any other part of the body. Thus in children affected with the rickets, the teeth grow equally well as in health, though all the other bones are much affected; and hence their Teeth being of a larger size in proportion to the other parts, their mouths are protuberant.

(To be continued.)

(*u*) [The dentinal tubules and their ramifications, the lacunæ and canaliculi of the cement, and even the inter-fibrous spaces of the enamel, are probably all provisions by which fluid of a nutrient character may permeate the dental tissues. But there is no proper circulation through the calcified structures of the human tooth, unless in those exceptional instances in which the Haversian canals may be traced in the cement or dentine. Change of material is much slower than in bone, as is proved by the above experiments of Hunter, which have been confirmed by the observations of Flourens and others. (1)]

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(1) Kölliker, op. cit., p. 309.

ORIGINAL COMMUNICATIONS.

ON SYMPATHETIC NERVOUS AFFECTIONS CONNECTED WITH THE TEETH.

A PAPER READ AT THE MONTHLY MEETING, COLLEGE OF DENTISTS, MAY 7, 1861,

BY H. T. KEMPTON, M.C.D. Eng., F.L.S.

THE subject to which I propose to call your attention this evening is one which, owing to the tendency of the present day to subdivide the study of Medicine, and to elevate certain diseases or the diseases of certain organs into special branches of practice, has been obscured rather than illustrated. The practice of specialities undoubtedly brings to light a number of minute and interesting details relating to particular diseases which might otherwise be overlooked; but, at the same time, the relation which the derangement of any individual organ bears to the whole body is apt to be lost sight of. This is particularly the case with regard to the diseases of the teeth, and the relation in which they stand to the general economy. It would almost appear that, the more these organs have been studied individually, and their diseases made the subject of a particular branch of practice, the more they have been neglected by the physician and the general practitioner, so that the sympathetic derangements to which they give rise have been erroneously attributed rather to local or to constitutional disturbances than to those connected with the teeth.

If we recur to some of the older writers, we shall find they were fully aware of the importance of tooth disease, and the general derangements it is capable of producing. The direct relation in which these organs stand to the proper digestion of the food has been generally recognised: thus, the celebrated Baglivi observes that "persons whose teeth are in an unclean and viscid state, though daily washed, have a weak stomach, bad digestion, and offensive breath; headache after meals, generally bad health, and low spirits. If engaged in business or study, they are irritable and impatient, and are often seized with dizziness. From weakness of the stomach, they are naturally somnolent, scarcely wakeful in the morning, and never satisfied with sleep." In such cases as the above, we can readily understand that imperfect mastication forms the first step in the production of impaired digestion, which, in its turn, is followed by the varied train of symptoms so constantly accompanying that fruitful source of disease. If, on the other hand, we consult the medical writers who were our immediate predecessors, we shall find little or no reference made to the influence which diseased teeth can exercise over the general health, or the power which they possess of exciting local disturbances in distant parts of the body. In fact, between the period when the first and the last writers flourished, Dentistry had become a special branch of practice; but it had fallen into the hands of persons who were for the most part entirely ignorant of the general principles of surgery or of the doctrines of physiology, while the medical practitioner seemed to have made a tacit surrender of these organs and their diseases, and at the same time to have blotted them out of his list of exciting causes. Moreover, since the medical writers of that period generally regarded the teeth as inorganic formations, they were but little inclined to admit that these organs could exercise any important influence over distant parts of the body. The advances which recent discoveries have made in our knowledge of the structure of the teeth has happily been accompanied with a truer appreciation of their relation to the rest of the body, and no enlightened physician or surgeon in the present day doubts the possibility of diseased teeth giving rise to serious local and general derangement. Mr Liston, in his *Elements of Surgery*, observes: "From the presence of carious teeth, or decayed portions of teeth, many evils both local and general ensue, besides inflammation and abscesses. They are frequently the cause, and the sole cause, of violent and continued headache; of glandular swellings in the neck, terminating in or combined with abscess; of enlargement and inflammation of the tonsils, either chronic or acute; of ulcerations of the tongue and lips, often assuming a malignant action from continued irritation; of painful feelings in the face; tic-doloreux; pains in the tongue, jaws, &c.; of disordered stomach, from affections of the nerves, or from imperfect mastication; of continued constitutional irritation, which may give rise to serious diseases."

It is not my intention to dwell upon the general derangements which may arise from the teeth, so much as upon certain nervous affections which they occasionally excite in neighbouring organs or in distant parts of the body. By this, I mean pain or functional derangement, which can only be accounted for on the supposition that the irritation set up by the irregular or diseased teeth has been propagated by means of the nervous communication, direct or indirect, which exists between the teeth and the part affected. The proof that the teeth are the source of the nervous or constitutional disorder is afforded by the cessation of the symptoms upon their extraction. It is not possible in many of these cases to trace the exact course which the irritation pursues, or, in other words, to point to a direct connection between the nerves of the teeth and the part affected. It will, however, enable us better to understand the possibility of such disturbances, if I first refer to the principal connections which exist between the branches of the fifth pair of nerves, which are distributed to the teeth and the other nerves of the body.

The fifth nerve arises by two roots, a large and a small, which emerge from the pons Varolii. Thus constituted, the nerve passes forwards to gain the anterior surface of the petrous portion of the temporal bone, where the larger of the two roots forms the Gasserian ganglion. Although this is the apparent origin of the nerve, the roots can be traced through the substance of the pons Varolii, and are found to terminate in the medulla oblongata. The fifth nerve thus resembles a spinal nerve as to its mode of origin by two roots, and, like a spinal nerve, the larger root is found to be a nerve of sensation, while the smaller is a motor nerve. The Gasserian ganglion sends off three branches,—the Ophthalmic, the Superior Maxillary, and the Inferior Maxillary. The two first divisions are purely sensitive; but the third bestows not only sensation, but also the power of motion. The reason of this is, that the smaller root, which has hitherto remained distinct, joins on to the third division of the ganglion, and thus renders it a compound nerve. The third division is also a nerve of special sense, inasmuch as it gives off the lingual or gustatory nerve, which supplies the tongue and governs the sense of taste.

Briefly, then, the ganglionic portion of the fifth nerve presides over the general sensibility of the organs of the senses, of the whole of the skin of the face, with the exception of that of the inferior and posterior part of the ear, and also over that of the mucous membrane of the mouth and nose, and of the conjunctiva; while the third division, or inferior maxillary nerve, which has been joined by the motor portion, besides imparting sensation to the teeth of the lower jaw, and some parts of the face also, bestows the power of motion on the muscles of mastication. In addition to the important functions which are thus fulfilled by the fifth nerve, each of its principal divisions forms communications with the sympathetic nerve. The *first* or ophthalmic division communicates by means of its nasal branch with the ciliary or lenticular ganglion; this ganglion also receives filaments from the third nerve and from the sympathetic, and gives off sympathetic, sensitive, and motor nerves to the eyeball: amongst these are the ciliary nerves. The *second* or superior maxillary division is connected with the sympathetic by means of the spheno-palatine or Meckel's ganglion, which sends off branches to the palate, orbit, and nose, and is connected with the other ganglia of the sympathetic, as well as with the facial. The *third* or inferior maxillary division communicates with the otic ganglion, which is itself connected with the superior cervical ganglion, and gives off branches which pass to the interior of the ear. This division is again connected with the sympathetic through the filaments which it sends to the submaxillary ganglion.

As the fifth pair of nerves preside over sensation, so the seventh pair govern the power of motion in all parts of the face, with the exception of the muscles of mastication, which are supplied by the fifth nerve in the manner that has been previously mentioned. The seventh nerve, before it emerges from the skull, passes through the cavity of the ear: while in this part of its course, it gives off a branch called the chorda tympani, which forms an important link between it and the fifth nerve. This branch issues from the cavity of the ear through a foramen on the inner side of the Gasserian fissure; it then passes downwards and forwards to join the gustatory or lingual branch of the fifth. In its course to join the lingual, the chorda tympani receives filaments from the sympathetic; and when it has arrived opposite the submaxillary gland, it sends off a filament to the ganglion of the same name.

I have thus rapidly traced the several connections which the fifth pair of nerves forms with the sympathetic and with the seventh pair of nerves. Let it be borne in mind that irritation in any part of a nerve will give rise to a sensation which will be referred to the peripheral extremity of its filaments, and that a sensitive nerve may excite a motor or sensitive nerve which is placed near its origin in the nervous centre, and we shall be able to comprehend the possibility of those remote affections to which I am about to refer, although we may not at all times be able to trace the precise course which the irritation pursues, from its point of origin to its manifestation in the peripheral terminations of distant and apparently unconnected nerves.

The affections which it is the object of the present paper to illustrate may be arranged under two heads: first, those which belong to remote parts of the body not connected with the organs of special sense; secondly, those which relate to the senses of sight and hearing.

In considering the etiology of these disorders, it should be borne in mind that it is by no means absolutely necessary for the teeth to be diseased. It is undoubtedly from carious teeth that these disturbances most frequently arise; but they may equally depend upon those irregularities which are determined by an abnormal process of growth and development in the teeth and the surrounding parts.

"It is well known," says Dr Ashburner, in his valuable work on Dentition, "that no part of the frame assumes at once the degree of perfection necessary for the complete performance of the functions to which it is destined. In order that the unfolding which accompanies growth—the evolution which is known by the term development—may be complete, a certain time is required; and as the whole frame is composed of many parts having among themselves mutual relations, the periods of their progress are characterised by events that are marked by the importance of the part to which they have reference. Each portion of the organism seems to be developed in its own turn, and its epochs of commencing existence, of improvement, and of decay, as well as its weight of influence on other parts, appear to have some relation to its importance in either the general government or the preservation of the being.

"Perhaps there is no law of growth better established than that which assigns to each organ, and to the entire organisation, certain periods of progress, that in a normal and regular order obey a determined course. During each of these periods there is the acquisition of a higher state of perfection up to a certain time of life. If there exists any circumstance determining an irregularity in the occurrence of these periods, the normal order is subverted; the *rule* which obtains in the majority of instances where a healthy and convenient configuration of the body is present must be broken, and the epoch arrive when it is *anormal.*"

The whole history of the derangements of childhood during the process of dentition is an instructive comment upon the previous statement. These derangements are, indeed, so constant and so well marked, that they are universally known and appreciated.

There comes, however, in after life, another epoch of tooth development, when a similar series of disorders may arise which are not so generally recognised. I refer to the appearance of the wisdom teeth. The germs of these teeth are peculiarly situated—those of the upper jaw being placed high up in the tuberosities of the superior maxillary bones, while those of the lower jaw are placed at the base of the coronoid process, and are, in fact, embedded in the cancellous structure of the bone.

The nervous derangements to which I allude are most frequently associated with the impeded development of the lower wisdom teeth, and it is, therefore, to the anatomical condition of these teeth that I shall confine my observations. Between seven and eight years of age, the first permanent molar has cut the gum, and assumed its position in the jaw immediately behind the second temporary molar, where it is placed between it and the base of the coronoid process. At the age of fourteen, the second permanent molar has made its appearance, and holds the same position with regard to the first permanent molar and the coronoid process as the latter had previously done to this process and the second temporary molar. It is, therefore, evident that the space occupied by the second molar was produced by the backward growth of the jaw. In order that the third molar or wisdom tooth should have sufficient space to enable it to assume its proper position in the jaw, the same process of growth must take place, and the jaw become elongated to the same extent as the antero-posterior diameter of the wisdom tooth. In the majority of cases this is what takes place; but there are, nevertheless, a large number of instances in which more or less disturbance is set up in consequence of an abnormal condition in the rate of growth between the tooth and the jaw, or even from an arrest of growth in the latter, while the former continues to develop itself. The consequence is, that the tooth cannot extricate itself from the jaw, for want of space in the horizontal ramus.

The period at which the wisdom teeth make their appearance varies exceedingly, but may be said generally to take place between the eighteenth and twenty-fifth year. We are all familiar with examples of local disturbance coincident with the development of the wisdom teeth. In some of these cases, the parts become swollen and tender, and the patient is troubled to masticate his food. Other cases are attended by symptoms of a more severe character; inflammation is set up, which, if not relieved, leads to the formation of abscess, and even to serious and extensive disease of the jaw-bone. In a third series, instead of inflammation and its consequences, the abnormal condition of the parts becomes the source of nervous irritation, which is communicated either to the sensorium—from whence it is propagated to distant parts of the body—or to some of the numerous connections which exist between the fifth nerve and the ganglionic system of nerves to the organ of the senses. The proof, as I have previously observed, of this being the case, is that the nervous affection ceases upon the tooth assuming its normal position, or, in other instances, where the disorder depends upon a diseased tooth, the cure following its extraction.

M. Velpeau has collected several of these cases, and amongst others he mentions the following:

Case 1.—A lady, at the age of twenty-two, began to feel a dull pain at the angle of the lower jaw on the left side of the face. The pain soon extended to the adjoining teeth, but was distinct from toothache. As the pain continued to increase in intensity for several months, it was thought to be a case of rheumatism, and was treated as such, but without good effect; then blisters, and a seton at the back of the neck kept open for a month, and opiates, were given, but all to no purpose. She went and resided at a watering-place for some time, but came back to Paris nothing benefited. At this time, the teeth were all good in appearance, the gums healthy, and nothing denoted the eruption of a wisdom tooth. However, upon making a section into the gum over the wisdom tooth, a probe passed down led to the discovery that the wisdom tooth was arrested in its progress by the direction it had taken—directly forwards, its crown coming in contact with the posterior surface of the second molar. The second molar was extracted, and the patient immediately released from her suffering.

(To be continued.)

DISEASES OF THE DENTAL PERIOSTEUM:

A COURSE OF LECTURES DELIVERED AT THE COLLEGE OF DENTISTS OF ENGLAND, SESSION 1860-61,

BY R. T. HULME, M.R.C.S., F.L.S.

(Continued from page 206.)

In describing the diseases of the periosteum, I shall commence with the consideration of simple inflammation and its results; I shall then speak of those forms of inflammation which have a constitutional origin, or depend upon agents which act through the constitution; next, of certain enlarged growths of the membrane, to which M. Magitot was the first to apply the appropriate title of "Tumours;" and, lastly, I shall examine those osseous growths which occur on the fangs of the teeth, and are commonly termed "Exostosis." These affections may be arranged as follows:

DISEASES OF THE DENTAL PERIOSTEUM.

Inflammation	Simple	Acute. Chronic.
	Constitutional	Rheumatism. Gout. Syphilis. Mercury Phosphorus.
Tumours		Fibrous. Fibro-plastic. Epithelial. Myeloid. Cyloblastions. Vascular.
Polypus		Simple.
Exostosis		Vascular.

Pain, heat, redness, and swelling are the four symptoms which usually indicate the presence of inflammation. To these must be added, impaired activity of the part; and, where the inflammation is acute or long-continued, the general health will become affected, and constitutional symptoms arise. Inflammation may be either acute or chronic; and there are few parts of the body in which the latter form is more frequently met with, or in which it extends over a longer period of time, than in the teeth. It will be most convenient to consider, in the first instance, acute inflammation as it occurs in the fang or fangs of a single tooth. The first symptom which is present is pain. At the commencement of the attack, this is generally so slight as to amount to little more than a feeling of uneasiness. The patient has an inclination to press upon the affected tooth with those of the opposite jaw, or he moves it about with his fingers, the pressure producing a momentary cessation of the uneasy feeling. The pain, however—which is of a dull, heavy kind—immediately returns, and soon becomes more severe. After a time, the tooth begins to feel as if it were too long for its socket; it projects beyond the level of the other teeth, and comes in the way of those in the opposite jaw when the mouth is closed. The elongation of the tooth arises from the swelling of the periosteum, which has, in consequence, thrust the crown of the tooth beyond its ordinary level. This symptom serves to distinguish inflammation of the periosteum from that of the pulp. So long also as the disease is confined to the pulp cavity, pressure on the tooth does not relieve the pain. The inflammation spreads to the gum, which becomes injected opposite the diseased tooth; the parts are hot, and the patient will sometimes tell you that the tooth feels too big for his mouth. At this stage the pain often becomes so acute, that the patient is compelled to have the tooth extracted. When this is done, the periosteum is found to be more or less injected and thickened.

This stage of periosteal inflammation was well exemplified in the following case:—The patient, a female about twenty years of age, had the crown of the second bicuspis on the right side of the lower jaw attacked by caries on the median surface, but not so much, apparently, as to account for the acute inflammation of the periosteum. When the decay was removed, after extraction, the dentine was found to be softened to the pulp cavity, and there was no difficulty in cutting into the latter. Even this would not of itself seem sufficient to account for the condition of the periosteum. When, however, the cavity of the tooth was broken into, the pulp was found to be in a state of partial decomposition; the smell was exceedingly offensive, and there was a large quantity of pus—a circumstance which readily accounted for the severity of the periosteal inflammation. The whole of the membrane was in a thickened, spongy condition, and had a kind of flocculent or velvety appearance. It was much injected; but the vascularity appeared in patches, and was most abundant on the side of the fang opposite to the decay, excepting at the neck of the tooth, just below the attachment of the gum, where the vascularity was excessive. The only other patch of blood-vessels on the side corresponding to the decay occurred at the apex of the fang, from whence it passed on to the opposite side. The whole of the lower and middle portion of the latter was extremely vascular, and at the apex became continuous with that of the opposite side.

The length of time during which this stage of the inflammation may continue varies considerably in different cases. Thus, in one specimen which I have on the table, and which also happens to be the second lower bicuspis from the right side of the jaw, the crown of the tooth was entirely destroyed, excepting a shell of enamel on the lingual surface ; the pulp cavity was open, and its contents in a state of decomposition. The patient, however, maintained most positively that he had never suffered from the tooth until the night previous to its removal; yet the whole of the periosteum was swollen and injected.

In another specimen, the fang of the left central incisor of the upper jaw, the history is somewhat different. The patient was an elderly woman, not in good health. The crown of the tooth was cut away for the purpose of placing artificial teeth in the mouth, but no pivot was inserted in the fang. The dentine was extremely sensitive, and continued in that state in spite of the application of the various means which were used to overcome it. The tooth was very sensitive to every draught of cold air, to the contact of hot and cold fluids, and to pressure. The state of the patient's health, who was suffering from diseased heart, and resided out of town, rendered it expedient at the end of a fortnight to remove the tooth. The periosteum was thickened, and the whole surface very uniformly injected; but there was no formation of pus. After extraction, I rinsed the fang in water, and placed it in strong spirits of wine. This had the effect of coagulating the blood in the vessels; and from it the diagram was made illustrating this stage of the inflammatory process, the nature of the part not permitting us to have recourse to injection.

If no remedies are made use of, and the inflammation continues, then those changes which mark the progress of inflammation in other parts ensue in the dental periosteum as well. Serum and liquor sanguinis are discharged from the distended vessels of the membrane, which is itself thickened and infiltrated with these fluids, and the fibrine of which becomes solid ; subsequently softening takes place, and is followed by the formation of pus. Suppuration having in this manner been set up, and the arrangement of the parts not permitting the pus to escape, it gradually accumulates and distends the surrounding structures. As the tooth lengthens, the vessels and nerves which enter the cavity of the tooth are put upon the stretch ; they are pressed upon by the swollen state of the parts, and the pain no longer possesses the dull, heavy, aching character which it had at the commencement, but becomes very intense ; the patient cannot bear even the pressure of the tongue on the inflamed tooth, and only liquid food can be taken ; he is deprived of rest, constitutional symptoms are added to the local disturbances, and the inflammation spreads to the periosteum of the jaw, which, together with the superimposed tissues, becomes swollen and of a deep red colour.

This constitutes the second stage of the disease, and it is at this period that the aid of the Dentist is usually sought. If, however, the disease is allowed to pursue its course, the alveolus becomes absorbed, a cavity is formed in which pus accumulates, and an alveolar abscess is established. The size of the abscess varies considerably in different cases—it may be the size of a pea, or as large as the top of the finger. Nature next sets about providing an exit for the pus. This usually takes place in one of two directions: the included matter either makes its way upwards, and is discharged at the neck of the tooth, or the wall of the alveolus becomes gradually absorbed, and a small opening is made, through which it passes, and then insinuates itself between the gum and the alveolus. In this way a kind of double abscess is formed—one within the socket, the other on its outer surface beneath the gum, the two being connected together through the opening which has been established in the alveolus. The gum then becomes thinned, until an opening is formed at its most prominent part, and the pent-up matter finds a passage into the cavity of the mouth. When this takes place, the sufferings of the patient are relieved: the discharge continues for a few days, the formation of the pus gradually ceases, or so far diminishes as to allow the external opening to close up. The situation of the opening varies in different cases, but in the lower jaw it almost invariably occurs on the exterior or buccal surface of the alveolus. In the upper jaw, if the abscess is connected with either of the external fangs, it also opens on the external surface of the maxillary bones; while, on the other hand, if it should be connected with the inner fang, it will open on the palatal surface of the jaw. It should also be borne in mind, that the external fangs of the upper molar teeth are often only separated from the cavity of the antrum by a layer of bone scarcely thicker than a piece of tissue-paper, and that in some cases the apices of these fangs are in direct contact with the lining membrane of that cavity. In consequence of the anatomical relation of the parts, it is quite possible for the abscess to open into the antrum, and thus lead to a further and very important complication of the original disease.

Of the *various causes* which give rise to inflammation of the periosteum, by far the most frequent is caries. When this disease has advanced so far as to penetrate the cavity of the tooth, it almost invariably produces inflammation of the pulp, and ultimately leads to its disorganisation. The inflammation then spreads to the periosteum, and is followed by the symptoms which have just been described. Another cause exists in the mechanical injuries to which the teeth are liable. These injuries have generally one of two results. First, a portion of the tooth is broken off: if the fractured portion is very small, no injurious results ensue; but at other times such a portion is removed as leads to the death of the pulp, and subsequent formation of an alveolar abscess. The second condition is when the tooth is forcibly driven up into the socket, and fracture of the parts is produced, or such extensive injury is inflicted as leads to inflammation and disorganisation of the surrounding structures. Very rarely inflammation arises in an apparently sound tooth from the effects of cold.

Treatment.—The treatment which should be adopted must evidently depend upon the stage of the disease at which the patient comes to us for advice, and also upon the condition of the pulp. In the first stage, when the periosteum is simply swollen and injected, the application of one or two leeches by means of the leech-glass to the gums opposite the fang of the diseased tooth will generally give relief — the bleeding should be encouraged by warm water. It is desirable, in the application of leeches to any of the six anterior teeth, to take care that they do not attach themselves to the lining membrane of the lips, as in some patients, especially delicate females, they are apt to give rise to considerable swelling of the part, extending on to the face.

Another local remedy at our command is the application of sialogogues: the simplest and best of them is bruised pellitory-root, which should be placed between the gum and cheek of the affected side of the mouth. This produces an increased flow of saliva, and thereby relieves the vessels of the parts. The administration of a dose of purgative medicine will frequently form a useful adjunct to the local remedies. Should these means succeed in arresting the periosteal inflammation, and it has arisen from cold no recurrence of the disease need be anticipated; but if, as is far more frequently the case, it has been produced by caries and inflammation of the pulp, then a permanent cure can only be obtained by applying the appropriate remedies for that complication of the disorder. In fact, before we can expect a permanent cure the periosteal inflammation, the exciting cause of it, must be removed.

Should the inflammation have gone on to the production of pus—and it is one of the misfortunes of the Dentist that he is seldom consulted in the early stages of any of the diseases of the teeth—our object should be to make a free opening for the exit of the included matter. If fluctuation can be felt, a free incision should be immediately made into the abscess, not only for the purpose of allowing as much pus as possible to escape at the time, but also because it will not close up quite so quickly as a mere puncture. It may be, however, that there is no opening from the alveolus by which the pus can escape. This is indicated by the absence of fluctuation, or its being exceedingly obscure. In all doubtful cases, it is perfectly justifiable to make the attempt, as the mere bleeding which follows is beneficial. There is, however, this objection, that it causes considerable pain to the patient, and not being followed with the result expected, or the amount of relief hoped for, he is apt to be dissatisfied. If, then, the abscess is not sufficiently advanced for lancing, the Dentist must endeavour to promote its progress to the surface, taking care that his application shall be applied in such a manner as to induce it to open in the interior of the mouth. For this purpose, warm fomentations should be applied to the external surface of the tooth, and to the corresponding part of the alveolus. If there appeared any tendency for an abscess to open on the exterior of the face, cold applications might also be applied externally. Lastly, in all these cases it must be left to the judgment of the practitioner whether the immediate removal of the tooth is not the best means of cure. Should this be resolved upon, it is seldom that anything more is required than to foment the mouth frequently with warm water during the twenty-four hours after the operation. By that time all the important symptoms will generally have subsided.*

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* Another mode of treating alveolar abscess has been proposed and practised by American Dentists, and was briefly described in the lecture. I must confess I have had no experience as to the efficacy of the proposed plan; but as it has received the important sanction of Professor Taft, of the Ohio College of Dental Surgery, I have given the subjoined account of it in his own words:

"When an alveolar abscess is influenced by cachexy, or any other constitutional derangement, general treatment must be resorted to, such as the condition indicates. The local treatment always demanded is such as will break up and destroy the secreting sac. This is effected either by surgical or by therapeutic treatment, and frequently in chronic cases by both together; but, in the great majority of acute cases, therapeutic treatment alone will be sufficient. In order to break up an abscess by an operation, it must be easy of access; and it is very seldom that an operation of this kind can be performed through the fang of a tooth; but, fortunately, in almost all those cases where the discharge is through the fang, therapeutic treatment alone will answer the purpose. Where the point of discharge is on the gum opposite the secreting sac, a sharp-pointed bistoury should be used, and the canal of discharge sufficiently opened to admit the free use of the instrument at the seat of the disease. Then the secreting sac should be dissected from the point of the fang, and its connection with the circulation severed as completely as possible, thus cutting off its supply. After this, if the case is a favourable one, nature may be left to accomplish the work; in which case, the broken-up sac will be thrown off, healthy granulations will be developed, and the parts be restored to complete health. In other cases, however, after an operation, nature unaided will not complete the cure; but such therapeutic treatment must be resorted to as the circumstances seem to require. In some cases, the opening through the alveolus will need to be enlarged; and this part of the operation demands great care. All particles of bone should be removed from this opening, since, if permitted to remain, they would produce irritation and tend to increase the difficulty.

"When the therapeutic treatment is applied through the fang, the canal is to be cleansed of all foreign and detached matter, and opened freely through the point; and if the discharge is very fetid, some disinfectant should be used, as chloride of sodium or of zinc, since a fetid condition keeps up the irritation. The cleansing of the fang may be accomplished

The operations of stopping and pivoting teeth have been enumerated amongst the causes of periosteal inflammation. When this has been the case, these circumstances so far modify

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by injection of chloride of sodium ; after which, the agent to act on the disease at its seat is to be introduced. Of this agent there are various kinds employed, the chief of which are chloride of zinc, nitrate of silver, and creosote ; the first being applied in the solid, and the latter two in the liquid state—though the nitrate may be employed in the form of crystal. The method of using the chloride is to pass it in small portions up the canal, on a piece of silk, with a fine probe, entirely through the point of the fang ; which process should be repeated from two to six times in as many days. After this, during two or three days, floss silk, moistened with a mild solution of creosote and tannin in alcohol, should be applied daily ; and then clean silk or cotton may be worn in the canal, changed every day, for three or four days, or till it is manifest that there is no longer any discharge, and that the parts are in a healthy condition. If nitrate of silver in solution or creosote is used, it should be absorbed into a piece of floss silk, and passed through the fang in the manner already described. The nitrate is more prompt of action than creosote, and will accomplish a specific object in a shorter time. Either of these solutions may, by the use of a syringe, be very effectively thrown through a fang in the following manner :—Fill the opening into the fang with gutta-percha, drill through it a hole large enough to receive lightly the point of the syringe, and then, charging with the solution, inject it through the fang ; and in cases where there is an opening through the gum, the injection may be forced round through this. The condition of the parts will indicate how long this kind of treatment should continue. Ordinarily, where the discharge is entirely through the gum, the bistoury should be used to enlarge the opening. In many cases, therapeutic treatment alone will accomplish the object ; and when the opening to the sac is large and direct, the therapeutic treatment agents may be introduced through it right to the seat of disease. If nitrate of silver in solution or creosote is used, it should be introduced to the point of affection on a pledget of cotton or floss, as heretofore directed ; or if, as is preferable, chloride of zinc or nitrate of silver in solid, it should be passed through the opening into contact with the sac. This treatment should be kept up till the indications are fulfilled.

"In the treatment of abscess of the inferior maxilla, much difficulty is often experienced from a want of free egress for the secretion ; while, in the superior teeth, the pus may frequently escape through the tooth by gravitation. This force, in the inferior jaw, increases the difficulty. The sac being usually formed on the point of a fang, the secretion then rests at the bottom of the socket, and is frequently pent up there till it finds an outlet through the gum, somewhere between the point of the fang and the neck of the tooth. It is, in many instances, very difficult to get an opening as low down as the point of the fang, particularly in the case of the molars and second bicuspids. Very seldom, if ever, can a secreting sac on the fang of an inferior tooth be destroyed by treatment applied through the canal of the root. Some are accustomed to make a vertical incision of the gum, as low as the point of the fang, and perforate the alveolus, and treat through this channel, as already the treatment, that when the inflammation is at all acute, the first indication is to insist upon the removal of the stopping or the pivoted tooth.

Such is the usual course which is pursued by inflamed periosteum, and such are the modes of treatment at our disposal: there are, however, some other complications which occasionally occur, and which I shall now proceed to notice. In defining inflammation, I said that when it was either acute or long-continued, it was accompanied with constitutional disturbance. In the case of the dental periosteum, this constitutional disturbance is generally either entirely absent, or is so slight as not to require any special modification of the treatment. If, however the tooth is situated at the back of the mouth,—as, for instance, the wisdom tooth of the lower jaw,—the swelling of the parts may be such as to prevent the removal of the tooth, and the most serious results may ensue.

Dr Chapin Harris has recorded the following case, which well illustrates these effects: In 1832, he was sent to visit a physician, Dr. E., who resided in the country. The Doctor had been attacked two weeks before with severe pains in the left dens sapientiæ of the lower jaw. At the expiration of three or four days, a physician had been called in who made several unsuccessful attempts to extract the tooth. The inflammation rapidly extended to the fauces, tonsils, and muscles of the jaw and face. Obstructed deglutition and intractable fever soon supervened. Repeated blood-lettings, cathartics, and fomentations to the face were resorted to with little effect. His respiration was difficult; and the muscles of his jaws soon became so rigid and firmly contracted, that his mouth could not be opened. In addition to the previous treatment, an injection with two grains of tartar-emetic was administered. About seven o'clock in the evening, the fever was succeeded by alternate paroxysms of cold and heat. An effort was then made to open his mouth with a wooden wedge. This was partially successful, but the teeth could not be forced asunder sufficiently to admit the smallest-sized tooth-forceps. But while his jaws were thus partially separated, he attempted to swallow some warm tea: in the effort, an abscess burst, and discharged nearly a table-spoonful of pus from his mouth; and it was supposed that double that quantity passed down into the stomach. This gave immediate relief; but it was not until about three o'clock in the

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described. Owing to the disadvantage above mentioned, much more energetic treatment is necessary to attain success with the abscess of the inferior than with that of the superior teeth.

"In the great majority of cases, where one-third or more of the periosteum of a root is involved in abscess, the indications certainly point to the removal of the tooth."—*A Practical Treatise on Operative Dentistry*, by J. Taft, p. 262; 1859.

afternoon of the next day that his jaws could be forced apart sufficiently to permit the extraction of the tooth which had caused the trouble. To the roots of this, which were united, there was a sac, about the size of a large pea, filled with pus. The patient recovered rapidly, and in a few days was quite well.*

Another point to be considered is the constitution of the patient. I have not placed the strumous or scrofulous diathesis amongst the constitutional causes of periosteal inflammation, because I do not believe that they act as a directly exciting cause; but when inflammation has arisen, it may very materially affect the course which it pursues. This is well shown in a case recorded by Mr Bell.†

Mrs ——, aged twenty-six, of a decidedly strumous habit, was far advanced in pregnancy, and had been attacked, three months previously to her consulting the writer, with severe pain in the lower jaw, in the ear, the submaxillary glands, and down the neck. Shortly afterwards the glands began to enlarge, and the face became at length enormously swollen, and resembled, in its general appearance, the most frightful case of *fungus hæmatodes*. The swelling, which extended over the whole side of the face, including the parotid and submaxillary glands, was hard and nodulated, and the surface here and there considerably discoloured. The mouth was almost totally closed; so that it was only by applying so much force as to produce considerable pain, that it could be opened even to the extent of a quarter of an inch. The dens sapientiæ was very much decayed; but it was impossible at that time to get any instrument into the mouth, so as to extract the tooth with safety. Six leeches were applied immediately, warm water was held continually in the mouth, a poultice was placed over the side of the face, and a wedge of soft wood was gradually introduced between the teeth, so as to depress the lower jaw. Three days afterwards, the mouth was sufficiently opened to allow of the introduction of a small pair of forceps, with which the tooth was extracted. A small quantity of pus followed, mixed with the blood; and a little thin, sanious discharge had previously passed through a small hole in the external part of the tumour, and rather more freely through one in the gum. As the system was greatly exhausted by continued pain, the want of rest and food—by the excitement dependent upon her particular situation, and by the reducing nature of the remedies which had been necessarily employed,—a more generous diet was adopted, and tonic remedies administered, under which treatment the patient perfectly recovered, though it was several weeks before the swelling had entirely subsided.

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* *The Principles and Practice of Dental Surgery*, by Chapin A. Harris, M.D., D.D.C., p. 534, 7th edit., Philadelphia.

† *Opus cit.*, p. 221.

Under a similar state of the constitution, the inflammation will sometimes extend to the periosteum of the jaw, and produce necrosis of a greater or less portion of the bone. Harris * mentions the case of a poor girl, fourteen years of age, who had had the crown of the first left inferior molar tooth broken off in an attempt at extraction. Inflammation of the periosteum supervened, and soon extended from the second bicuspid to the coronoid process of the jaw. It terminated in necrosis and exfoliation of all this portion of the bone, which was removed at the end of four weeks.

When an abscess has formed, it has been mentioned that it usually opens on the external surface of the alveolus, except when it is situated around the palatal fang of the first or second upper molar. By these means, an exit is provided for the included pus in a situation where it produces the least injury to the patient. This beneficial arrangement, however, does not always take place, and occasionally the matter burrows into the cancellous structure of the bone, and makes its appearance at some distance from the original seat of the disease. Thus, an abscess around one of the first molars may open opposite the neighbouring bicuspid. I have already referred to the possibility of the matter finding its way into the antrum in the case of the two first upper molars: the same result is also possible with regard to the upper bicuspides. In the case of the upper molars, it may also pass in the course of the palatal process of the maxillary bone, and form a swelling on the roof of the mouth. A very remarkable case has been recorded by Harris,† in which the matter had made its way from the two central incisors along the roof of the mouth, and discharged itself behind the velum palati. The same place of discharge occurred in the case of an abscess attached to the first upper molar.‡

Another most untoward and troublesome result is where the matter forms an opening on the exterior of the face. Once such an opening has been established, no method of cure will be successful so long as the tooth remains in the jaw; the secretion of pus or of a sanious discharge continues, and prevents the fistula from healing up. The rapidity with which the operation of extraction effects a cure is very surprising, and that after the lapse of even two or three years. The most remarkable instance of this kind with which I am acquainted is a case recorded by Mr Parker§ of Birmingham. The patient, Thomas ——, aged twenty-three, had the crown of the first right lower molar broken off, in attempting to remove it, in November 1850. The fangs were allowed to

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* *Opus cit.*, p. 479. † *Opus cit.*, p. 535.

‡ *Dental Medicine*, by Thomas Bond, A.M., M.D., p. 206; Philadelphia, 1852.

§ *Lancet*, vol. i. for 1858, p. 238.

remain in the socket. Considerable pain was experienced for several days, which ultimately led to the formation of an abscess, which broke externally. Six months had scarcely elapsed, when several other abscesses made their appearance in various parts of the neck, numbering in all thirteen Several attempts had been made to remove the fangs of the broken tooth, but without success; the man's health suffered, and he became very weak from the continual discharge. On the 23rd of November, 1857, Mr Parker removed the stumps, which, he found, were much necrosed. On December 6th, the man had no more discharge externally, but a little came through the opening in the gum, and by the 3rd of January a perfect cure was effected. Thus the disease, which had altogether lasted for seven years, was cured within five weeks after the removal of the fang.

The possibility of such an occurrence should render us very careful in the use of warm applications to the exterior of the jaw. Bell mentions an instance of a fistula having existed for two years in consequence of an abscess which had been produced by the root of the right inferior wisdom tooth. The extraction of the root prevented the further secretion of pus; but the communication with the mouth was so freely established, that some of the whiskers protruded internally. In such a case, it would then be necessary to pare the edges of the wound, and bring them together by means of a suture.

THE DENTAL REVIEW.

LONDON, JUNE, 1861.

We have before us, at this moment, a revised list of the Members of the College of Dentists of England. All friends of the College, old and new, will read this list with satisfaction. It shows that the ranks of the College are steadily refilling, and that the organisation of the Institution is now confirmed and completed. The 160 or 170 gentlemen who constitute the College may look back on their labours with no mean degree of pleasure. What they have done in their public capacities is to them, perhaps, less than to others, who merely look on at intervals and from a distance, matter for surprise, as it is to us; and not merely for surprise, but for congratulation and respectful sympathy. We have thought it, therefore, worth the labour, both as an historical record and an analytical work, to examine for our readers that which the College really has done. Founded now some five years, it has, in the first place, been the mainspring of those political changes which have had for their tendency to make the Dentists of this kingdom a representative section of the community, and, in a word, a Profession. Even out of some of the rubs which have marked the progress of the College in its contact with other interests situated externally to it, good has been elicited; nay, out of dissensions from within its own circle, principles have been awakened, skill has been learned from war, and wisdom from adversity.

But, while politically the College of Dentists has founded a new empire of a Profession in this land—while it has done this in a way so as not in the merest degree to impinge on the rights and principles of any other Profession—while it has claimed for Dentistry, name, place, and independence, it has sought to carry out those intentions by placing them on the basis of a correct knowledge and an advancing science. If there be in some minds a doubt whether subserviency is not the best and soundest political basis,—and whether, therefore, the non-subservient policy of the College is or is not sound,—there can be in no honest mind a moment's doubt that the strain made by the College for the interests and advancement of learning has been pre-eminent in effort as in success.

Let us remember that, five years since, there was not a single educational thing done or doing for the Dentist that met his special requirements as a practical man. From this negation, let us turn to the results of the labours of the College, and to that which is now presented.

First, in the centre of the Metropolis there is opened an excellently-arranged meeting-place for the use of all respectable Dentists who may like to join in common pursuits with the rest of their brethren. Here they have a Reading-room, a rapidly-increasing Library, and a Museum to which they may add, as to a common fund, those records of disease or specimens of healthy structure, by the study of which pathology on the one side, and physiology on the other, are each developed.

Secondly, at given seasons there are to be heard in the theatre of the College, well-prepared and carefully-selected Lectures, adapted not only to the wants of the student, but to those of the practitioner. To their special end, these Lectures are in every sense as appropriate as those which are delivered at the College of Physicians, or any of the learned Societies.

Thirdly, the Members of the College have among themselves organised a Society for the mutual discussion of practical matters connected with advancements in Dental Science and Art; while two of them, with a liberality and foresight which reflects on them lasting honour, (we mean Mr Robinson and Mr Tibbs,) have established valuable prizes for the encouragement of original and meritorious research.

Fourthly, through the exertions of the Members of the College, a scientific literature has been given to the Dentist which he never had before, and which he would not possess except in occasional annual or biennial efforts necessarily limited in their range, were it not for the Transactions of the College, and the support given by the College, without any show or ostentation, to the advancement of literary art, and the advancement of that art in its highest and most useful phases. In this literature, (we appeal to our own pages as reference for the facts we are about to state,) personal allusions, petty disputations, and twaddle of imbecile conceit, are all cast aside to make way for better, purer, and therefore more powerful and enduring motives. And that this end has been attained through the influence exerted by the College of Dentists, is proved by the fact that, in commencing this course, we were at first and for a long time mainly supported in our work by the representatives of this Institution. That many others, seeing the position we were taking, afterwards joined us, is true; but it is not the less fair to the recent Councils of the College to state that they were the first to second our exertions in this behalf, and that, come what would, they did not wish their cause to be sustained either by low journalistic cunning, or by constant overflow of abuse on individuals and institutions at enmity with them. It is by virtue of this moral support that our desires have been so completely realised, and that we have been enabled, not merely to go on improving and improving the scientific matter of our pages, but to leave all the coarse, falsifying, and illiterate stuff that we found predominant, and that was making Dentistry a loathed thing, to seek another channel for its expression and perpetuation.

Lastly, for the benefit of the student, the College of Dentists has inaugurated a School. That School, complete in all its branches, has met as yet with a degree of success which, to all concerned in it,—originators, teachers, and pupils,—must be equally pleasing.

Of all requirements, indeed, which the position of such a body as the College of Dentists has demanded, but one additional requirement remained. We mean, a Dental Hospital in which the students and associates connected with the College, and recognising its principles, should receive such practical instruction as should supplement the learning they might acquire within the College itself. We rejoice, therefore, to hear that the promoters of the College of Dentists, feeling now that their previous exertions are permanently and safely fixed, have found the time and the will to carry into effect the design of completing the last part of their important programme. The movement in this direction, for a long time past quietly in fruition, is now nearly perfected: the first public meeting for the foundation of the new institution is called; friends have risen in every direction to give support; a sufficient sum for the purposes of inauguration is subscribed; and by the time of our next issue, we shall, we doubt not, have to state that the "National Dental Hospital" is opened as another addition to the useful and beneficent charities of this kingdom.

Where there is a will, there is a way. There are, at least, one hundred and sixty men who, more or less, are bound to the principles of independent action for the promotion of the Dental body: let each one of these, knowing no such word as failure, individually, and in his sphere, advance the claims of the new movement in a simple and practical way, and by the issue of the June number of this Journal for 1862, the National Dental

Hospital may easily be made the leading School of English Dentistry, and the field from which Dental practice and literature will be perennially and most effectually enriched.

REVIEW.

Elements of Medical Zoology. By A. Moquin-Tandon, Member of the Academy of Sciences, &c. Translated and edited by Robert Thomas Hulme, M.R.C.S.E., F.L.S., Lecturer on Dental Surgery; Member of the Board of Examiners of the College of Dentists of England. Baillière, Regent street.

Odontological Science rests under considerable obligations to Medicine. The first impetus it received in this country came from the labours of one who is entitled to all honour as the father of Physiological Surgery. Since that time, it would be easy to show that both here, in America, and on the Continent of Europe, Dental Science has been constantly receiving direct and indirect aid from men whose business of life it has been to practise the healing art in its entierty, or to enlarge by scientific investigation its resources. But the good offices which Medicine has rendered to Dentistry, the latter has already begun to repay with no slender interest. We might point to the history of the introduction of anæsthetic vapours—to the anatomical labours of Bell, Nasmyth, and Tomes, and to the aid which in practice the modern physician receives from the improvements effected in Dental mechanics, in proof of our assertion. Another instance of the same kind lies before us in the work of M. Moquin-Tandon, translated and edited by Mr Hulme. A succinct account of such portions of Zoological Science as are directly related to Medicine was not to be found in the whole round of English professional literature, until Mr Hulme presented the medical world with this beautiful, elaborate, and comprehensive volume. As this translation is the work of one who, whilst he is an accomplished naturalist and comparative anatomist, is at the same time a teacher and practitioner of Dental Science, we propose to furnish our readers with some account of its contents.

The first portion of the work is devoted to the Natural History of Man, or Anthropology. After an enumeration of the grand anatomical distinctions which separate man from the brute creation, the Author concludes the first chapter with the following striking passage, which, we believe, contains a truth that cannot be too strongly insisted on in this age of conjectural science and philosophical credulity :

> "All these are, however, physical characters : there are others of a far higher order, which establish an immeasurable interval between our species and all other animals. Man is especially distinguished from even the most highly organised beings by his understanding, his perfectibility, his knowledge of God, his idea of the infinite, his love of the beautiful, and by his moral sentiment. Thus the great Linnæus, in his *Systema Naturæ,* after bestowing upon man the name of SAPIENS, did not draw up for our species a series of distinctive characters taken from the number, the proportion or the form of the bodily organs, in the manner he has done for all other living beings, He justly despised the hands, the feet, the teeth, and the mammæ ; he confined himself to writing after the generic name *Homo,* and repeated after his specific name these profound and significant words : NOSCE TE IPSUM."—(P. 2.)

It is curious that, amongst the *savans* of the Continent, the developmental chimeras which are at the present time darkening the mental vision of some of our men of science seem to be producing but little effect. There can be little doubt that the present tendency of thought upon the other side of the Channel is towards a juster, nobler view of the position, dignity, and origin of man, than that which naturally resulted from the materialism so zealously propagated in the eighteenth century. In proof, we need only refer to the quotations introduced by M. Tandon, in his chapter on the Human Kingdom, from M. Geoffroy St Hilaire, and to an essay by another distinguished naturalist, M. Quatrefages, which has lately appeared in the *Revue des deux Mondes.* The theories of Lamarck and Oken have long been dismissed as untenable in the countries which gave them birth. With trifling modification, they are now revived in England, and men of the foremost rank in science are becoming their expositors or disciples. We appear to be rapidly drifting into the pleasant belief that man is only a remarkably clever mammal closely related to the monkeys; and that if we trace his pedigree still higher, we shall finish at last by an acceptation in its most literal sense of the verity that "all flesh is grass."

In the second chapter of the work, which describes at length some of the peculiar features of human anatomy and physiology, we find M. Tandon making the following statement with regard to the time of the appearance of the permanent molar teeth :

> "Of the twelve molar teeth which are never shed, four make their appearance at the age of four years and a half, four at nine years of age, and four much later."

Mr Hulme corrects this assertion by appending an abstract of the published observations of Mr Saunders, who observed the period of eruption of the permanent teeth in a large number of instances, for the purpose of fixing a standard by which might be determined the age of children employed in factories. It is highly improbable that there is any material difference in the average age at which the second dentition takes place between the population of this country and that of France. There can be little doubt, therefore, that the original statement of the text is the result of a very limited or faulty observation. Instances are not very uncommon in which the first permanent molars come into place as much as two years before the usual time of their appearance.

We must only make a passing reference to the chapters on "a supposed Wild Man," on "the Unity of the Human Species," on "the Races of Man," and "the Human Kingdom." The first contains a curious account of two deserted children, who, after passing years in the woods of France, were accidentally captured, and submitted, without, however, great results to civilising and educational influences. One of them was an undoubted idiot, and had probably been abandoned on account of his imbecility.

An unfortunate, having a similar history, was well known in England in the reign of George III. under the name of Peter the Wild Boy. The love of the marvellous has invested the stories of these miserable beings with an extraneous importance, and a paradoxical philosophy has sought, by the collection and examination of a series of them, to discover the peculiar characteristics of primitive man. De Lamettrie selected in this way six characters which he considers distinguish man *in a state of nature.* How utterly worthless are all such speculations, will at once appear on the reflection that all history, all observation, prove that man apart from his fellow-man is not—cannot be —in a state of nature. Wherever man is found, he is the member of a society which, however low its organisation, has its origin in the "moral instincts relating to family, to property, and to religion," and is distinguishable from all associations of the lower animals, not only by the motives which have instituted it, and the moral and intellectual gains which are its result, but by its constantly presenting a tendency towards improvement on the one hand, or deterioration on the other.

Before quitting the subject of Anthropology, we may remark that Mr Hulme, by appending to the somewhat scanty account of the varieties of man given by M. Tandon an abstract of Dr Latham's classification, supplies a marked deficiency in this part of the book. M. Geoffroy St Hilaire's summary account of the human sub-races, quoted by M. Tandon, is founded upon physical characteristics alone. Dr Latham's distribution is, although not entirely, to a great extent the result of a study of the affinities and origin of languages. Considering the complexity of man's constitution, the psychical as well as physical elements in his nature, it cannot be denied that the latter mode of investigation promises as reliable information as to his relationships, as does the study of variations in external form; and it is a one-sided ethnology which yields its assent to conclusions based on the one set of facts, whilst it slights or altogether ignores inferences legitimately deduced from the other.

The second part of the work is dedicated to Medical Zoology proper. Its opening sections are occupied with organisation and classification. These are followed by a very full account of all the animals and animal products employed in the science and art of Physic—ancient or modern.

Medicine and Pharmacy would assuredly supply one of the most remarkable chapters in a History of Human Error. What a curiosity is a "bill" of a mediæval practitioner! How astonishing appears the credulity that could prescribe—or, we may add, that could swallow—such a farrago! The list of ingredients which in *Macbeth* make the witch-broth "thick and slab," bears a striking resemblance to the catalogue of animal substances M. Tandon gives as once used in Physic. Yet these things were not prescribed at random; there is no doubt that the employment of each had its foundation in a specific theory, which at the time carried as great a weight of probability as do some of our vital and even chemical theories now. Many of these substances were used in consequence of their supposed talismanic or occult qualities; others were prescribed on the principle *similia similibus curantur*, or on the ground of some fancied correspondence between the remedy and the malady. The Author observes that it is somewhat difficult to trace the relation:

> "The ancient therapeutists often sought for what they termed correspondence between the disease and the remedy, but it is impossible to conjecture what were the relations upon which they founded the virtues of many animal substances. Thus, in spitting of blood, they recommended the patient to drink kid's blood mixed with vinegar; in diseases of the kidneys, they prescribed the back of a hare to be eaten raw or cooked, *but without touching it with the teeth;* in diseases of the spleen, they applied the spleen of a dog over the region of the affected organ; in disorder of the liver, they ordered the dried liver of a wolf in wine sweetened with honey, or that of an ass bruised in honey with two parts of celery and three nuts!"—(P. 64.)

This is ridiculous enough, no doubt; but we must be careful we do not laugh too loudly at our forefathers' expense. In the nineteenth century, the virtues of infinitesimal doses of arnica, sugar of milk, sulphur, and rattlesnake poison are believed in; and men who profess to credit the system which prescribes them, and by its aid to combat disease, hold degrees and diplomas in

Medicine and Surgery from British Universities and Colleges, and are entitled by the highest authority to practise upon the bodies and purses of Her Majesty's lieges.

Our space will not permit us to follow the Author through the clear and scientific account which he offers of the animal substances employed in the modern practice of Physic. We can only say that it is full and comprehensive, and far surpasses, in the amount of information which it affords, most of the ordinary works on Materia Medica. The contributions which the animal kingdom has made to the resources of scientific Medicine are not numerous; but the therapeutic value of one substance—cod-liver oil—probably surpasses that of all the vegetable and inorganic curative agents which have been discovered or invented during the past quarter of a century. We believe we may safely assert, that at the present moment far more people in this metropolis are indebted for life to cod-liver oil than to any other therapeutic agent in the whole circle of the Materia Medica. We learn from M. Tandon that it is a mistake to suppose that the oil in use is solely obtained from the Cod. Several other species of Gadoid fishes furnish it: amongst them are the Dorse, the Haddock, the Capalan, the Hake, the Whiting, the Coal-fish, the Ling, the Torsk, and the Burbot. Besides the oil obtained from the Cod genus, it has been proposed to employ in Medicine the oil yielded by the livers of the Skates and Sharks. The former contains less iodine and sulphur, but more phosphorus, than does the *oleum jecoris morrhuæ*, and is said to be very mild and well adapted for infants. Shark-liver oil, on the contrary, contains, according to Dr Delattre, the active principles in larger proportions. "It is richer in iodine and phosphorus, but it contains less bromine and sulphur. The increase in the quantity of iodine is double what is lost in the bromine."

The portion of the work which treats of animals noxious to man, although neither poisonous nor parasites, contains an account of a genus of the Salmon family (the Serra-salmes) remarkable for their carnivorous and gregarious habits. Living together in shoals, they attack any animal which may chance to come into their waters. They are provided with sharp triangular teeth, with which they bite so sharply and quickly that the wound is not felt more than the cut of a razor. They appear to attack man without any reluctance:

> "One of the best known species is the *Piranha*, or *Devil-fish*, discovered by M. de Castelnau in Uruguay, in the rivers Tocantin and Amazon.
>
> "When any object is thrown into the water inhabited by the *Piranhas*, these fish immediately attack it. One of the companions of M. de Castelnau, being oppressed by the heat, wished to bathe; but no sooner had he entered the water than he was attacked by a shoal of the *Piranhas*, and he saw his blood pouring forth and discolouring the water. He made for the bank, which was fortunately close at hand, and he thus escaped what was otherwise certain death."—(P. 214.)

The Hæmopis, or Horse-leech, which appears never to bite the external surface of the human body, but always attacks the mucous membranes; the Cimicidæ, or Bugs, with their allied genera, the Nepa or Water-scorpion, the Hippoboscidæ or Horse-flies; that torment of African travel, the Tsetse; Gnats, and Musquitoes, together with various other stinging insects,—are all the subjects of careful scientific description; whilst much interesting information is appended as to their habits, and as to the effects which their bites are capable of producing in man and animals. Not a little curious are the effects which have been collected and authenticated respecting the bite of the Tsetse.

> "The horse, the ox, and the dog, after they have been attacked by this insect, waste away and die in the course of a few days. Those which are fat and in good condition soon die, while the others drag on a miserable existence for some weeks; three or four flies are sufficient to produce these disastrous results. The blood of the animals which die is altered and diminished in quantity; the fat in the neighbourhood of the wound is soft, viscous, and of a yellow colour; in general, some portion of the intestines is enormously swollen; the flesh putrefies very quickly; and the heart, the lungs, and the liver are more or less affected. The goat is the only domesticated animal which can live with impunity in the midst of these flies; dogs escape the danger when they are fed exclusively by means of the chase, but if these animals are fed with milk they invariably die; on the contrary, the calf has nothing to fear so long as it sucks.
>
> "The bite of the Tsetse is not dangerous to wild animals; the elephant, zebra, buffalo, and the various kinds of antelopes

and gazelles which abound in the countries inhabited by the fly, do not experience any ill effects from it."—(P. 229, 230.)

The sting of this insect does not appear to be poisonous to Man, or at all events it is not sufficiently so to endanger life. The above curious facts, however inexplicable they may appear on any chemical theory of assimilation, are given on the authority of such trustworthy observers as Livingstone, De Castelnau, Oswald, and Anderson.

We must pass over the sections which the Author devotes to the history of animals poisonous to Man, and of the epizoa or external parasites, although they are full of details equally worthy of notice. The last part of the book is occupied by an account of the Entozoa, and it undoubtedly presents to the physician one of the best epitomes of the extant information respecting them.

M. Tandon divides the Entozoa into four series. The first division is that of the Insect Entozoa. It has been long known that the larva of certain flies of the family of Œstridea infest the bodies of domestic animals, and there is sufficient evidence that they may occasionally be found in Man: even according to some observers, the human body is the peculiar habitat of one or two species. The larvæ of the *Cuterebra noxialis*, an American species, which are found in the ox, the dog, and the jaguar, not very unfrequently are observed to attack the surface of the human body, where they give rise to painful tumours of considerable size. The *œstrii* of Europe are less often discovered in Man: nevertheless, they have been found in the nasal passages, the frontal sinuses, beneath the skin, and in various parts of the mucous tracts.

The second series is that of the Crustaceous Entoza. The only species which is known to occur in Man is the *Linguatula denticulata*. The *linguatulæ* appear to form a connecting link between Helmintha and Crustacea. Formerly they were ranked amongst the former, but sufficient reason has been shown by M. Van Beneden for placing them amongst the Crustacea. These animals possess a nervous system, consisting of a rudimentary ring, without cerebral, but with a subœsophageal ganglion, whence proceed two principal filaments which traverse the length of the body. They have a dorsal vessel, a complete intestinal canal with oral and anal orifices, and the sexes are separate. In the undeveloped state, the *linguatulæ* live encysted in the bodies of herbivorous animals. They are then asexual; but afterwards, on passing into the bodies of the Carnivora, they acquire with their full development the sexual organs.

The Helmintha, Intestinal Worms, or Entozoa proper, form the third division of internal parasites. The attention which Helminthology has of late years received from various distinguished naturalists has been rewarded by discoveries of surpassing interest. A knowledge of the transformations of the Cystic Helmintha into the Tæniæ, and the various modes in which these Entozoa migrate from one species of animals into another, the discovery of parasites in the blood (Hæmatozoa), of the transformations of the Distoma, &c., are not only amongst the most remarkable of the results of zoological investigations, but they are especially valuable from the light they throw upon the vexed question of spontaneous generation. With regard to the class of internal parasites, there can be no doubt in the present day that Entozoa are always produced by Entozoa.

Since the appearance in France of M. Tandon's work, the history of the *Trichina* has been more fully made out by the researches of Virchow and Leuckart. The result of their investigations is thus epitomised by Mr Hulme:—

> "The history of the *Trichinæ* has been fully cleared up by the researches of Virchow and Leuckart, and there is no longer any question as to its being a distinct species of Entozoon.
>
> "On feeding rabbits with food containing *Trichinæ*, Virchow found that in three or four weeks the animal became thin and weak, and died in the course of five or six weeks after taking the food which contained the entozoa. When the body of such an animal is examined, the muscles are found filled with thousands of *Trichinæ;* and there is no doubt that death has been produced by the progressive atrophy of the muscular system, owing to the migrations of the *Trichinæ.*
>
> "When food containing *Trichinæ* is swallowed, the entozoa become liberated from the muscular tissue in which they are lodged in the stomach, and from thence make their way into the small intestines. On the third or fourth day, sperm-cells and

eggs are found, and the sexes have become distinct. Soon afterwards the eggs are fecundated, and are developed in the body of the females. The young are expelled from the vaginal aperture, situated on the anterior half of the worm. Virchow has found them under the form of minute *Filaria* in the mesenteric glands, and in the serous cavities, particularly those of the peritoneum and pericardium; they appear to traverse the intestinal walls, in all probability by penetrating, like the Psorospermia, the epithelial cells of the intestine. Virchow has been unable to detect them in the blood, or in the course of the circulation.

"As they continue their migrations, they are found in the primitive muscular fasciculi, where they are met with in considerable numbers three weeks after the food has been taken, and have attained nearly the same size as those which had been enclosed in the flesh eaten by the animal.

"In order to be certain that the animal was not already infested by the *Trichinæ*, Virchow, on several occasions before feeding the animal, excised and examined a portion of the muscles of the back, and was unable to find a trace of the entozoa where they were afterwards so plentiful.

"The *Trichinæ* penetrate the primitive muscular fasciculi in succession Behind them the muscle becomes atrophied, while an irritation is excited around them, and on the fifth week they commence to be encysted, the sarcolemma becomes thickened, and a cyst is formed around them.

"Virchow prosecuted his experiments by means of the muscle of a woman who had died in the same manner as has been mentioned with regard to the rabbits, and whose body presented no other lesion than the presence of innumerable *Trichinæ*. What is most important, is the fact that these entozoa may exist even in fatal numbers, and yet not be visible to the naked eye. This was the case with the body of the female mentioned above: it is only when the cyst is in a very advanced state of cretification that they are visible to the naked eye, and this may not take place for months after the animals are first encysted.

"The patient had been under the care of Professor Zeucher of Dresden, and had been brought from the country. On making inquiries in the locality from whence the woman had come, Professor Zeucher found that a pig had been killed containing *Trichinæ*, and that the hams and sausages which had been made from it contained a large number of these entozoa. The butcher who had killed the animal, and several other persons, had had rheumatic and typhoid symptoms of greater or less severity; but no other person besides Professor Zeucher's patient had died in consequence."—(P. 351-353).

Amongst the Infusorial Entozoa which form the fourth series of M. Tandon's division, are the Virgulina Tenax, ananimalcule found in the tartar of the teeth, and one or two species of Vibrio which appear, both in health and disease, in the mucus of the mouth.

One of the practical lessons deducible from the modern discoveries in Helminthology is the importance of thorough cookery. Half-raw meats cannot be eaten with impunity; all animal tissue used as food should be exposed to such a temperature as will destroy the vitality of any organic germs it may contain, would we avoid the development of Tæniæ in our alimentary canals, and Trichinæ in our muscles.

The work we have been reviewing not only deserves the attention of the Medical Practitioner, as conveying within small compass, and in readable style, a large body of useful information which he will fail to find elsewhere, but we can recommend it strongly to the notice of the Dental Profession. Natural History and the Dental Art have ever been in close alliance: many are the illustrious instances which prove the congruity of the two pursuits. In every section of Mr Hulme's translation will be found waifs and strays of information which may prove of use in the practice of Dentistry; whilst to the lover of Zoological Science for its own sake, every chapter will afford its quota of well-authenticated fact, or will indicate fresh paths for investigation and research.

SELECTED ARTICLES.

TREATISE UPON THE GENESIS AND DEVELOPMENT OF THE DENTAL FOLLICLES TO THE EPOCH OF THE ERUPTION OF THE TEETH.

By Drs Ch. Robin and E. Magitot.

(Translated for the 'Dental Cosmos,' by E. Sureau.)

(Continued from page 223.)

The Superior Maxillary.

Until near birth the upper maxillary preserves the form of a bent osseous band or thin plate, of less height than length, so that the globe of the eye which supports it seems to rest, and does really rest, upon the upper floor of the mouth. This peculiarity exists in the embryos of all the Mammiferæ, excepting the differences in the shape and size of the maxillary.

At the outer edge of this bone, before it has become very thick (about the fifty-fifth day in man), there appears a thin external crest, and another internal one : these limit a groove which is shallow at first, and has rather more the appearance of a furrow. A similar peculiarity is observed shortly afterwards upon the inter-maxillary. It is the production of these crests, or osseous lips, which gives the anterior edge of the bone that thickness which it has not yet acquired.

From the time that these crests appear, a small filament can be seen at the bottom of the furrow in its two posterior thirds : this filament is formed of vessels and nerves the nature of which can be learned by the use of the microscope. From this period we can ascertain that which the rest of the evolution shows still better —that the suborbital nerves and vessels are there, and that the external lip of the dental groove passes above them, near its anterior extremity, in order to allow them to reach under the skin. This groove is thus produced immediately below the eye—a place occupied at that time by the edge of the upper maxillary, and which the nerves and vessels continue to occupy. The same thing occurs in the lower maxillary, where the groove appears before that of the other jaw. The groove of the upper maxillary is common to the follicles, which are about to appear, and to the vessels which remain suborbital. It is the bottom of this groove which, by consequence of the phases of development, becomes the suborbital canal, just as in the opposite bone it becomes the dental canal; but this phenomenon occurs very much sooner in the superior than in the inferior maxillary. Nevertheless it is at the bottom of this groove, against the suborbital nerves and vessels, and consequently in the part which afterwards becomes the suborbital canal, that the follicles also originate. Those of the molars are, however, the only ones that originate here, for the canal belongs only to the maxillary and not to the incisive bone, and because it is already separated from the groove in front when the follicle of the canine makes its appearance. Once produced, the upper maxillary groove exhibits the following characteristics :—

From the third month, its posterior half, which was confounded with the suborbital canal, becomes closed, and separates the follicles placed at the level of the vessels and nerves.

The external and internal plates which confine it are thin, fragile, sharp at the free edge, and a little undulated. The groove is, as it were, slightly varicose, because the plates sink a little at the level of the interval of the follicles from the time of the appearance of the latter. Near the commencement of the fourth month, the rudiments of the alveolar partitions are formed at this level, as they are in the lower jaw; but they are produced at the same time at the bottom and upon the sides of the groove, in the shape of thin, semicircular, sharp-edged projections. After the seventh month they reach, in height, nearly but not quite to the level of the edges of the groove between the first molar and the canine, as well as between the incisors: the rest of the groove remains undivided and common to the two molars. At this period the nerve and suborbital vessels, which start at first at the level of the line of contact between the canine and the second incisor, show their orifice of egress at the level of the rudimental partition interposed between the first molar and the canine. That part of the upper maxillary which separates the canal of the bottom from the follicles is, at this time, only in the condition of a thin, osseous plate, not thicker at most than from a quarter to a half millimetre, and perforated by one or two very small orifices intended for the passage of the vessels destined for these organs. The suborbital vessels and nerves still describe a slightly concave curve, like the canal, below the ocular globe. The communication of the groove of the follicles with the suborbital canal at the level of the molars, from the time of the follicle of these teeth and their continuance in the neighbourhood, until the period when their removal is induced by the development of the Hygmore sinus, are facts important to the determination of the nature of this canal, the method of its formation, and its analogies with the inferior dental canal.*

The follicles, which are placed at the level of the grooves, originate therefore in that which is called the inferior dental canal and in the suborbital canal, both canals being at that time in the form of grooves. It is only in consequence of the development of the follicles and of the maxillary bone that the groove becomes isolated and closed at the bottom so as to constitute a conduit, from which the crowns of the teeth depart more and more.

II.—The Mucous Membrane.

When we examine the bed of soft parts which covers the alveolar edge of the jaw, we find first a plate of mosaic-like epithelium more or less developed. This plate has considerable thickness in the ruminating animals, where it alone is as thick as the subjacent soft parts which separate it from the maxillary. The cells composing this epithelium are very distinctly pavimentous, and their volume is less in the neighbourhood of the mucous membrane than on the free surface. In man this epithelial bed is much thinner, and is easily detached from the subjacent tissue; while in the herbivora it is more adherent. In both the cells of the inner part are more difficult to distinguish than those of the superficial portion, yet it is always possible to determine the point of union between the epithelium and the mucous membrane. The precise point of junction of these two tissues is clearly indicated by a line in the preparations seen by transmitted light ; the refracting power of these tissues is elsewhere very different, and their differences of texture can be already appreciated when but very slightly magnified. The clearness of the distinction that we are about to establish is already observed in the period of development preceding the appearance of the follicles.

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* The signification of these facts, which are observed in all the Mammiferæ, seems to have escaped the anatomists and physiologists. M. Cruveilhier is the only one who has made any mention of the removal of the teeth and of the orbit at the time of birth. He says: "At birth, the alveolar range is almost contiguous to the floor of the orbit."—('Anat. Descriptive,' Paris, 1843, second edition, vol. i., p. 167.)

Beneath the epithelial bed is a band of quite thin tissue, which trenches by its density and opacity upon the subjacent beds, with which it is, however, in fibrous and vascular continuity. This band should be considered as the mucous membrane, properly so called. It is of a greyish colour, and microscopic examination exhibits a fibrous texture ; it, in fact, reveals bundles of laminated fibres, of a compact texture, immediately contiguous or very near each other. It is very resistant and tenacious, although very flexible, and it is easy to see in the fresh embryos that it possesses great vascularity.

Near the period of the appearance of the follicles, either before or after, according to the species of animal, we begin to perceive the papillæ of the mucous membrane, in the shape of small conical or hemispherical projections. They are on the surface of the web of the mucous membrane, extending into the epidermis which covers it ; but the surface of the latter does not reproduce the form nor the projections. At the lower face of the chorion of the mucous membrane the salivary glandules appear in the form of short *culs-de-sac*, projecting into the submucous tissue, which we are about to describe. They are not found at the level of the groove, but a little from it, before and behind ; this fact is always observed when we separte a certain length of its tissue on removing the follicles. The mucous membrane gives a brilliant and glossy appearance to the free or dental edge of the jaws, which is thick and cylindroidal at the surface.*

In cutting this membrane we perceive, one after another, the differences of appearance that distinguish it from the soft, almost gelatinous tissue, described later, which is placed below it and fills the groove. It can be separated, by careful dissection, without injuring even the subjacent follicles when they already exist.

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* At the period of which we have spoken in the first place, and which is the time when the follicles make their appearance, we see only the so-called *primitive dental groove* of the mucous membrane of the free and thick edge of the jaws, at the bottom of which, according to Goodsir (1838) commence the projections or papillæ, the germs of the teeth. This error, notwithstanding its evidence, is still repeated in many of the more recent works. It is useless to remark that this mistaken groove of Goodsir bears no analogy to the osseous *dental groove* described above.

When the operator reaches the free edges of the maxillary laminæ of the groove, or a little below them, he finds the mucous membrane adhering to the periosteum which covers its external face; the mucous membrane cannot be separated from it, and drags it away with itself. It is at a much later period, about the fifth or sixth month of the intra-uterine life in man, and at a corresponding period in the other mammifera, that the follicles adhere so strongly to the mucous membrane that they cannot be separated without dissection, and induce later a slight depression of that membrane at their level.*

(To be continued.)

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* It is these depressions which have been taken for the orifices of the gingival canaliculi communicating with the follicles of the teeth. (Hérissant, 1745, who had formerly, but wrongly, admitted that the membrane of the follicle was a continuation or fold of the mucous membrane of the gums; Bonn, 1773; Oudet, 1835; and others.) This hypothesis was overturned by the observations of Raschkow (1835), but reasserted and developed since by Goodsir (1838), and at last refuted recently by M. Guillot. It is known that an increased thickness, of a whitish grey colour, is developed at the expense of the mucous membrane, at the line which is occupied by the teeth after their issue. This thicker part rises in a projection or sharp crest, and from space to space on its free edge there are small depressions or incisures, which give it a slightly denticulated appearance. At the base, along the concave or posterior edge of the gum, it shows a fold which follows the posterior edge of the dental groove, and marks the line where the gingival mucous membrane extends itself with the buccal mucous membrane, properly so called, thinner, and more rosy. The preceding hypotheses have exaggerated the importance of this furrow, which has little depth, and is interrupted and crossed from space to space by the projections of the mucous membrane, which extends along the base of the gingival crest. This furrow vanishes little by little in company with the crest, and in the same proportion as the edge of the jaws is rounded and broadened by the growth of the follicles. At no period does it show orifices traversing the mucous membrane, not even when it is reduced to a series of depressions. The gingival crest has been for a long time called the *dental cartilage* (*cartilago dentalis*), and has been considered as really formed of cartilaginous tissue. It is, however, only composed of fibrous, vascular tissue, covered with a thick bed of mosaic-like epithelium. Near the level of each canine there is a membranous projection, in the form of an ear; it is more distinct below than above, and more upon certain subjects than on others; these projections occur in both jaws, or occasionally only in the lower one. This auricle disappears about the third or fourth month after birth. When it is well developed, its form is curious—it is depressed towards the middle, where it often shows two or three papillary projections that are visible under the microscope; they are also occasionally found at its anterior extremity. It, as well as its papillary projections, has a remarkable vascular richness. In the lower jaw the right auricle is usually connected with the one on the left by a membranous order, which rises above the sharp edge of the gingival crest. This border is from one to three millimetres in height, less projecting than the auricles, but vascular also, and having some microscopic papillary projections near the auricles. In this way it forms in the lower jaw a kind of small, thin lip, extending from the level of one canine to the other; without doubt it assists in suction, and in consequence of its vascularity it must assume a kind of erection.

PROCEEDINGS OF DENTAL SOCIETIES.

COLLEGE OF DENTISTS OF ENGLAND.

MONTHLY MEETING.—May 7, 1861.

W. Perkins, Esq., in the Chair.

Dr Purland exhibited a cast of the mouth of a gentleman aged fifty-six, in which the bicuspids and first molar on the reflex side of the lower jaw had come forward to the front of the mouth, and formed a second row of teeth behind the incisors and canines. Twelve months previously, these teeth were in their proper position in the jaw. No reason was expressed for this curious transposition of the teeth.

The paper for the evening was by Mr Kempton, "On Sympathetic Nervous Affections connected with the Teeth."

The Author commenced by referring to the effects of specialities in practice detracting from our recognition of the remote effects of certain diseases, and that this had especially operated in regard to the teeth.

Having given a general description of the fifth pair of nerves and the principal connections which they form with the other nerves of the body, the writer divided his observations under three heads, consisting of, 1st, cases in which disease or retarded development of the permanent teeth produced general affections of the body, such as epilepsy, neuralgic rheumatism, and even insanity; 2nd, cases in which amaurosis and some other affections of the eyes were distinctly traced to the presence of diseased teeth; and 3rd, cases of partial deafness depending upon the same cause.

A short discussion followed, in which the Chairman, Mr Hulme, Mr Williams, and other Members took part.

The Chairman then announced that the present terminated the series of Monthly Meetings for the Session; and in making that announcement, he thought he might fairly congratulate the Members upon the success which had attended the Meetings. Although only four papers had been read during the Session, the subjects selected had been most appropriate. The first paper, by Mr Hulme, was "On Calcification of the Dental Pulp," and he need scarcely tell them that the subject was most ably treated by that gentleman. The second, by Mr Weiss, "On the Hardening of India-rubber by Steam," occupied the attention of the Members on two successive Meetings. This paper, which was a most elaborate one, entered into every detail connected with the process of vulcanising, and was evidently the result of much time, thought, and experiment on the part of the writer. The third paper was by Mr Williams, "On Defective Palate, with the Mechanical Appliances for its Remedy." This paper was most interesting, and was illustrated by many beautifully-executed specimens of artificial palates. The fourth and last paper was that which had just been read. The subject was full of interest to the Dentist, and had been most ably treated by Mr Kempton, to whom he begged to offer the thanks of the Meeting. In concluding his remarks, he could not help expressing a hope that, during the ensuing Session, the Students and younger Members of the College would favour the Meetings with papers on Dental Science, and thus endeavour to assist in the development and improvement of that Profession in which they all must feel so greatly interested.

The proceedings terminated by a vote of thanks to the Chairman.

Lectures.—Dr Richardson delivered the first of a Course of Three Lectures "On the Salivary Glands and Saliva," before the members of this College, on the evening of Tuesday, the 14th inst. After a few introductory remarks, Dr Richardson gave a general outline of all the glands of the body, showing their natural division into secreting and non-secreting glands, and their classification according to position, structure, and function. He first described them as belonging to great tracts, including a comprehensive enumeration of all the glands. He then gave a general idea of the construction of glands, remarking especially on the great law, that in the construction of glands, as much blood as is possible is brought to a point by blood-vessels, and exposed to the largest possible secreting or elaborating surface. He also dwelt on the important and peculiar influence of nerves in regulating the supply of secretion in glandular structures. After concluding the anatomical, structural, and physiological classification of glands—in which he devoted special attention to the organs of insalivation, the parotid, sub-maxillary and sub-lingual glands,—Dr Richardson took up the question, " Why individual glands should produce specific secretions?" explaining the primary facts, that the blood is the source of every secretion ; that the power of *special secretion* does not lie in the mechanism of a gland, and that the whole process of secretion is evidently conducted through the agency of some chemico-physical relationship existing between cells and blood.

ELECTION OF MEMBERS.—At a Meeting of Council, held on Tuesday, May 21st, the following gentlemen were elected Members and Associate of the College :—*Member*, Mr Haslar Harris, Gower street, Bedford square. *Associate*, Mr Charles George Greening, Edward terrace, Caledonian road, Islington.

ODONTOLOGICAL SOCIETY OF LONDON.

ORDINARY MEETING.—MAY 6, 1861.

W. M. BIGG, Esq., President, in the Chair.

Mr **TOMES** related the following case. The patient was a female of about four-and-twenty. She described her symptoms very much in the following manner:—Two years and a half ago, she was seized with an unpleasant feeling of tension at the back part of the lower jaw on each side of the mouth. The jaws gradually closed, so that after the lapse of a few months she could open the mouth only sufficiently wide to admit a very small teaspoon. From time to time she applied to a medical man, who told her that the lower wisdom teeth were gradually approaching the surface, and that he could feel them with a probe. He advised that she should patiently wait till they appeared through the surface of the gum. This state of things was allowed to go on for two years and a half. At the time Mr Tomes saw the patient, he found the teeth closed, and he could scarcely obtain a view of the back part of the mouth. The two second molars were decayed and useless. She complained of getting but little sleep, and of frequent attacks of pain in the temple, and pain in the neck, extending from the angle of the jaw down as far as the shoulder. The course of treatment was pretty obvious. Chloroform was administered, and the mouth was forcibly opened with an instrument. The two second molars were then removed. On the following day he saw the patient, who stated that she was relieved by the operation, both from the feeling of tension and from the pain in the temple, that she had passed a comfortable night, and that the freedom of motion in the jaw was very much increased. She left town on the following day, and he had not had any opportunity of learning how the case progressed.

Mr **Coleman** mentioned the case of a gentleman in the medical profession, who had recently returned from India, with a constitution much impaired. He was attacked with pain in the second molar tooth of the right side of the lower jaw; it was followed by considerable swelling, with inability to open the mouth; and after a time several abscesses pointed under the chin, and were opened; some also opened into the mouth, which at the time he first saw him, almost three months after he had first felt pain in the tooth, were fistulous openings, discharging a thin sanious pus, of a very offensive odour. The great tumefaction of the parts, together with the evidence of considerable necrosis of the jaw, rendered any attempt at forcible extension out of the question, and the necessity of laying open the cheek to afford the means of removing the offending teeth and dead bone was discussed by Mr Laurence and Mr Coote, under whose care the patient was. Before, however, so formidable a means was resorted to, he was desired by those gentlemen to see the patient, and, if possible, remove the tooth. The patient being placed under chloroform, an attempt was made to remove the tooth by a curved elevator, which was not successful. The patient having stated previously, that he believed that the inner portion of the alveolar process of the jaw had exfoliated, the tooth was pushed inwards and into the mouth, from which it was, with considerable difficulty, removed. After this, the wisdom tooth was removed with the elevator. The latter had, by its pressure between the coronoid process of the lower jaw and the second molar tooth, been the sole cause of the mischief, both teeth being perfectly sound. Some dead bone was also at the same time removed.

In a few weeks after the operation, the patient was in a very improved condition, being able to open his mouth, and had also gained flesh; but eventually malignant disease set in in the lower jaw, which carried him off about four or five months after the teeth were removed.

Mr **Mummery** said the case related by Mr Tomes reminded him of one that occurred in his own practice about two months since. A young lady from Berkshire, of fine, healthy constitution, and about two or three and twenty years of age, consulted him respecting her teeth, her mouth having been then closed about four weeks. The jaws could only be separated sufficiently to allow the introduction of a card between the incisor teeth. Mr Mummery first introduced a thin slip of wood between her teeth, and at the end of two hours he was enabled, by the successive introduction of slices of cork of gradually-increasing thickness, to separate the teeth sufficiently to see the back of the mouth. The lower wisdom teeth had each of them one tubercle protruding from the gum, and the second molaris on each side was diseased. He succeeded in drawing the lancet across the two wisdom teeth, and then gave the patient other slices of cork to take home, and in three days the mouth was sufficiently open for him to introduce the forceps and extract the second molares. He saw her on the following day, when she could open her mouth with very little effort, and he removed a portion of the thickened integument covering the wisdom teeth. On her last visit, about a fortnight since, she was enjoying perfect health. The patient had been in the state described, at intervals, during a year and a half, and her mouth had remained closed for a period of three weeks or a month at a time.

The remainder of the evening was occupied with the discussion on Mr Bridgman's paper read at a previous meeting of the Society, in which Mr Tomes, Mr Arnold Rogers, Mr Cattlin, and other members of the Society took a part. The writer of the paper was not present.

The **President** announced a paper by Mr Truman, "On the Necessity of Plasticity in Mechanical Dentistry," and the meeting was then adjourned.

CORRESPONDENCE.

EXPLOSION OF TEETH.

TO THE EDITOR OF THE 'DENTAL REVIEW.'

SIR,—Having noticed, in the report of the Meeting of the College of Dentists in the last number of the REVIEW, some remarks by Mr Rymer respecting a phenomenon termed "explosion of the teeth," I crave your kind permission to make a few observations on the subject.

I have not seen the article in the 'Dental Cosmos' referred to by Mr Rymer, but I have met with an instance of a somewhat similar circumstance in my own practice; a large lower molar tooth having split asunder in the antero-posterior direction, after a rather narrow fissure-like cavity on its masticating surface had been stopped with amalgam. I have no doubt whatever that this untoward occurrence was due to a curious property which some of the amalgams possess of expanding in bulk some considerable time after they have set and become apparently quite hard. I have repeatedly noticed amalgam stoppings that have, after a time, projected beyond the level of the margin of the cavity, forming a distinct ledge all round, although made perfectly level in the first instance; and I have as frequently observed portions of the walls of the cavity split off, exposing the stopping, and rendering it liable to be readily displaced. The shape and position of the cavity, the strength of its walls, &c., will, of course, determine the particular result of this swelling or expansion of the amalgam.

It is worthy of note that this phenomenon is not, as far as my experience goes, met with in the amalgam of mercury and copper, known as "Sullivan's cement," nor in that composed of mercury and silver only; but I have almost invariably observed it more or less in all those amalgams where there is an admixture of *tin* with the silver. I have, therefore, for several years past discontinued the use of these *compound* amalgams, and employed *silver only* as base, (a mixture of silver filings and precipitated silver is what I use,) as I consider the advantages arising from the presence of the tin more than counterbalanced by this very serious disadvantage attendant upon it.

I do not pretend to offer any explanation of the *rationale* of this expansion which takes place in the compound amalgams; but, as the subject is one of some importance, I am induced to address you respecting it, in the hope of eliciting some additional information from other members of the Profession.

I have the honour to be Sir, your obedient servant,

HENRY LONG JACOB, M.R.C.S.

Bridgwater, May 14, 1861.

MISCELLANEOUS.

NATIONAL DENTAL HOSPITAL.—On Tuesday next, June 4th, an important Meeting is appointed to be held at the College of Dentists, Cavendish square. The object of the Meeting is to complete the organisation of a public Institution for the treatment of Diseases of the Teeth, and in furtherance of the educational objects of the Metropolitan School of Dental Science established in connection with the College of Dentists. The subject was first discussed and plans suggested at the Council Board some years ago, but the events of the time had the effect of delaying the matter until now. We hope to see the Meeting on Tuesday well attended, and the movement heartily supported, as it deserves to be. We understand that the new Institution, to which it is proposed to give the name of 'National Dental Hospital,' has already received promises of support to a large amount in donations and annual subscriptions. The Meeting is convened for seven o'clock in the evening, and John Brady, Esq., M.P., will preside.

Dental Colleges.—There have been objections made to Dental Colleges on this as well as on the other side of the water, and we feared at one time ourselves that they might not meet the best wants of the Dental student; but we gained confidence every year, as we saw more and more of their good effects. The objections raised against them have not been felt in this country; but, on the contrary, the most sanguine expectations of their strongest advocates have been fully realised. We do not mean in the money sense, to those who conduct Dental Colleges, but we know that better Dentists are made in a shorter time, and at a less sacrifice to the community, than the old way of telling and showing a young man how to operate, and then let him learn the rest by the mischief he does to his first patients. Besides, there is another and very important moral principle being established; and that is, it places operators on an equality with each other, as in medicine, and causes them to fraternise and respect each other—entertain and support their common interest; it breaks down the old-fogy exclusivism; it is the only way that an eminent operator's favourite and matured methods of practice can be incorporated into the young members of the Profession, and perpetuated for permanent good. —'Dental Cosmos,' May, 1861.

Chloroform in Dentistry—"It may not be entirely out of place, and will be excused here, to say a few words on another subject—the danger or unpleasantness of administering chloroform for other affections or other operations than pregnancies to pregnant women. There is more than one instance, as where chloroform was given for dentistry purposes, it has been followed by sudden and premature labour in the Dentist's operating-room—a very awkward accident! Very considerable discretion and caution are necessary, also, in administering chloroform to females who happen to be menstruating at the time. A Dentist at Montreal, in America, was tried and found guilty of committing "rape" on such a patient; but a witness for the defence, on the trial, testified that it so happened that, in another instance, the same thing was stated by another lady, his wife; but such an affair was impossible, as he was all the time in the room, by her side. It was subsequently found, as also in the well-known case of Dr Beale, of Philadelphia, that the three ladies were actively menstruating at the time; and erroneous dreams, so characteristic of this state and the second stage of anæsthesia, were excited."—Dr Kidd, 'Obstetrical Transactions.'

NOTICES TO READERS AND CORRESPONDENTS.

All communications intended for insertion in this Journal must be authenticated by the name and address of the writer, not necessarily for publication, but as a guarantee of good faith.

Contributors are requested to be so obliging as to write legibly, and on one side of the paper only.

The conclusion of Mr Williams's paper on Defective Palates is unavoidably postponed to next month.

Dr Jacobi's Lecture on 'Dentition and its Derangements' will be concluded in our next.

BOOKS RECEIVED IN EXCHANGE.

The Dental Cosmos for May.
The New York Dental Journal for April.
L'Art Dentaire, January to May.
The Pharmaceutical Journal for May.

THE

DENTAL REVIEW.

JULY, 1861.

ORIGINAL COMMUNICATIONS.

DISEASES OF THE DENTAL PERIOSTEUM:

A COURSE OF LECTURES DELIVERED AT THE COLLEGE OF DENTISTS OF ENGLAND, SESSION 1860-61,

BY R. T. HULME, M.R.C.S., F.L.S.

(Continued from page 206.)

LECTURE II.

MR PRESIDENT AND GENTLEMEN,—In my last lecture, after describing the structure and arrangement of the dental periosteum, I spoke of the symptoms, causes, and treatment of acute inflammation of that membrane. I proceed in the present lecture to consider the course which the inflammation follows when it assumes a chronic form. I shall then notice the effects of certain conditions of the constitution upon the periosteum of the tooth; and lastly, I shall describe certain growths which take their origin in a morbid condition of this membrane.

The symptoms which indicate the existence of chronic inflammation of the periosteum are the same as those which occur in the acute form of the disease, only they are not so intense or so distinctly marked. Thus, the patient is troubled with a continued, dull, aching pain; the tooth or teeth are somewhat loose in their sockets, and may eventually become misplaced · the patient is unable to use the teeth in mastication, or can only do so with difficulty, and they are extremely susceptible of the contact of hot and cold fluids, which often produces excruciating pain; there is frequently a slight purulent discharge, which oozes from the necks of the teeth: the margin of the gum is swollen and separated from the teeth; it is either of a deep red colour and of a spongy character, or it may be pale: in some cases there is a fistulous opening opposite the apex of the fang, which alternately discharges and closes up, leaving in the latter case a small fungous-like papilla of the mucous membrane, which marks the aperture of the fistulous opening.

Lastly, in all these cases, at longer or shorter intervals the patient experiences paroxysms of sharp, lancinating pains in and about the part where the affected teeth are placed. This chronic inflammation is sometimes accompanied with progressive absorption of the alveoli around the necks of the teeth.

The pains are often increased in night-time when the patient becomes warm in bed, and that without the disease depending upon either rheumatism or syphilis. This may be accounted for by the increased warmth of the bed, and by the assumption of the horizontal position, in consequence of which the blood flows more readily to the diseased tissue.

This state may continue for weeks and months with but little alteration in the condition of the tooth. But during this time, besides the local symptoms, the patient is frequently troubled with pains along the course of the jaw in which the diseased teeth are placed. Sometimes the pain becomes fixed in one or more teeth of the opposite jaw; or it may extend over the same side of the head and face,—in fact, to all the parts which are supplied by those filaments of the fifth pair of nerves which are most intimately allied to the superior and inferior dental branches.

The following well-marked instance of sympathetic pain in the teeth of the opposite jaw lately came under my notice:

The patient was a strong, healthy young man, about twenty years of age. He had been suffering from acute toothache for some days, which he referrrd to the second upper bicuspis on the left side. The pain was so great, that he presented himself at one of the London hospitals and requested to have it extracted, which, without any examination of the mouth, was most improperly complied with. On examining the tooth the same day, I found a spot of incipient decay on one of the proximal surfaces, but nothing which would indicate that it had been the cause of the toothache. At this time the patient was still suffering, the operation not having produced even that temporary relief which occasionally occurs in cases of sympathetic pain. On examining the mouth, I found all the teeth in the upper jaw were perfectly sound; but in the lower jaw on the same side the wisdom tooth was considerably decayed. I immediately pronounced this tooth to be the cause of the pain, and recommended its extraction, as the caries had produced inflammation of the periosteum, the tooth being somewhat loose and painful on tapping it with the handle of an instrument. The caries had not penetrated the pulp cavity; and had it been any other than the wisdom tooth, it might have been advisable to have endeavoured to subdue the inflammation, and afterwards to have stopped the tooth. The patient at the time was unwilling to lose the tooth, not feeling satisfied that it was really the source of his sufferings. Three days afterwards, the pain continuing, he again called upon me: the inflammation was now more advanced, the tooth loose in its socket, and painful on being touched. The extraction of the tooth was easily accomplished, but was exceedingly painful, as it invariably is in cases of inflamed periosteum. The operation was perfectly successful, and the patient has since been free from all pain.

Another sympathetic affection which may also arise under the influence of chronic periostitis of the dental membrane is ear-ache. This appears to be associated most frequently with the molar teeth of the lower jaw, and more particularly with the wisdom teeth. A ready explanation of this sympathetic pain is afforded by the numerous and intricate relations which exist between the nerves of the teeth and those which supply the internal ear. In brief, then, besides the local symptoms, there are various sympathetic pains about the head and face which may accompany and be dependent upon chronic periostitis. The very fact of this complication existing is apt to lead to an erroneous judgment as to the real nature of the disease. Such a state of things is often allowed to continue for months, and the patient goes on suffering under the idea that his complaint is one of true neuralgia, and not of diseased teeth. Similar sympathetic pains may of course arise where the disease is confined to the pulp of the tooth. It cannot, however, be too strongly impressed upon the mind both of the Dentist and the Medical man that these affections may depend upon a diseased condition of the teeth, since those remedies which will give relief in true neuralgia will be entirely useless where the nerve affection arises from diseased teeth, and no permanent relief can be obtained until these organs are submitted to treatment. It has been laid down as a distinctive character between the sympathetic pains depending upon diseased teeth and those arising from true neuralgia, that in the latter case the attacks are marked by a character of periodicity,* while in the former the pain occurs at irregular intervals. I think, however, that every practitioner must have noticed cases in which it was extremely difficult to trace the periodicity of attacks of pain depending upon true neuralgia, while in other cases in which the pains were sympathetic they have closely simulated the periodicity which so constantly accompanies neuralgia. Under these circumstances, then, I think it should be laid down as an axiom in medical practice, that in all cases of continued pain or repeated paroxysms of pain about the head and face, the condition of the teeth should be invariably inquired into; and that so long as diseased teeth are allowed to remain, it is impossible to say they are not the source of the patient's sufferings.

The following case may be mentioned as illustrative of this point, although caries, not periostitis, was the cause of the neuralgia. The patient was a healthy-looking girl about nineteen or twenty years of age: she had been suffering for a year and a half from constant attacks of pain over the right side of the head and face, which, while they lasted, incapacitated her from following her occupation, which was that of a housemaid. She had been under the care of a medical man for some months, who had prescribed various remedies under the idea that the case was one of facial neuralgia. No relief was, however, obtained, and at length he candidly told her he could do nothing more for her. The lady in whose service she was at the time I saw her, asked me if I knew of a cure for neuralgia. My first inquiry was naturally as to the state of her teeth, which, I was assured, were perfectly sound. When, however, I examined her mouth for myself, I found that the first molar tooth on the lower jaw was decayed on its distal surface,—that is, between it and the second molar. I at once obtained the patient's consent to the extraction of the tooth, and the operation was followed by the complete cessation of the neuralgic pains, from which she had been suffering for the last year and a half. In this case, no doubt decay had been going on for a long time, and had set up irritation of the nerves, extending to the various branches of the fifth pair which are distributed to that side of the head and face. The caries being situated between the two teeth, rendered it liable to be overlooked by any one who had not especially devoted his attention to diseases of the teeth. At the time I saw the patient there was no difficulty of this kind, since the decay had advanced so far as to undermine the enamel to such an extent that a portion of it had broken away.

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* See Bell, *opus cit.*, p. 315.

These sympathetic pains may occasionally extend even to the shoulder and arm. The following interesting case is recorded by Mr Bell:*

In May, 1827, Mr D., a gentleman about fifty years of age, applied to him in consequence of severe pain occurring in irregular paroxysms, first attacking the ear, and from thence darting down the neck and shoulder, and through the whole length of the arm, so as considerably to diminish the power of the hands and fingers. He had been for more than a year the subject of this affection, and had, latterly, consulted a physician of the highest character, who, finding that the medical treatment which he recommended had failed to produce the slightest relief, requested Mr Bell to see him. This gentleman was informed that the second inferior molar tooth had been broken about two years before, in an attempt to extract it, and that the roots were still remaining in the jaw. The anterior one had been partially thrust out of the alveolus, and lying obliquely in the gum; the posterior still remaining firmly fixed, but evidently producing considerable irritation in the surrounding parts, with increased pain on pressure, which in some degree assumed the character of those paroxysms which he had so long been suffering. Mr Bell therefore removed both the roots, and had the satisfaction of hearing some time afterwards that the complaint had entirely ceased.

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* *Opus cit.*, p. 313.

Do not, however, let us fall into the opposite error, and indiscriminately extract teeth merely because there are pains about the head and face. There are at least three sources from whence the pain may arise. In the first place, the neuralgia may depend upon malaria; it is in such instances that the periodicity of the attacks is most strongly marked, and this, together with the history of the case, will generally enable us to distinguish between neuralgia depending upon the poison of malaria, and that produced by diseased teeth. Secondly, the neuralgia may arise from disease in the trunk of the nerve, or from inflammation of its sheath: when this happens, the patient can obtain little or no alleviation of his sufferings by means of local applications applied to the terminal branches of the nerve; while in those cases depending upon the teeth, local applications will often afford temporary relief. The condition of the teeth might in some cases be supposed to determine the question,—that is, if the crowns of the teeth were free from caries, and their periosteum from inflammation, that then they could not be the source of the neuralgic affection. We shall, however, find hereafter that this is not always the case, but, on the contrary, certain severe cases of neuralgia may be traced to the presence of exostosis on the fangs of teeth which externally have every appearance of being perfectly sound. Bearing, however, these facts in mind, we shall not often err in our diagnosis, and shall be able to determine what connection may exist between these painful affections and the organs of mastication.

Whether, however, the symptoms which accompany chronic inflammation of the dental periosteum are merely local, or whether they extend to other parts at some period or another during its course, as in the case of acute inflammation, it leads to the formation of pus. This may either make its way out at the neck of the tooth, when there is a constant discharge of a larger or smaller quantity of purulent matter, and which can be increased by pressing the socket of the tooth; or at other times it produces an ordinary alveolar abscess, which opens opposite the fang of the diseased tooth, but occasionally at some distance from it. When the latter is the case, the true source of the discharge can generally be determined, if not by the state of the tooth, yet by the vascular and swollen condition of the gums immediately opposite the seat of the abscess. The opening which nature forms of one of these abscesses is usually small, but it often remains permanent, and, as previously mentioned, the gum becomes red and thickened around the aperture, forming a small projecting papilla. When a tooth is much decayed, so that the pulp is completely destroyed, leaving the canal pervious in the centre of the fang, and communicating with the abscess, then the pus may escape in this direction. Chronic inflammation of the dental periosteum may give rise to the same untoward results as the acute: thus it may lead to the destruction and loss of a considerable portion of the alveolus, or it may form a fistulous opening on the external surface of the face.

Where a number of teeth or stumps are attacked with chronic inflammation, the disease may cause serious disturbance of the general health. Matter is being constantly discharged from the diseased teeth into the mouth; this becomes mixed with the saliva, and then passes into the stomach, giving rise to that numerous train of symptoms which accompany impaired digestion. It often happens that the diseased condition of the teeth originates in derangement of the digestive organs: when this is the case, the purulent discharge from the dental periosteum serves to aggravate the original disorder, and it is in vain for the medical attendant to attempt either to cure or amend the derangement of the digestive organs while this unhealthy condition of the teeth is allowed to remain.

Another result of chronic inflammation of the periosteum is the formation of a membranous cyst or bag attached to the fang of the tooth, and generally containing pus in its interior. These cysts usually form in the neighbourhood of or around the apex of the fang, but sometimes they extend along one side of it. Two theories have been put forward as to the mode in which these cysts are formed. Mr Bell* says, " an effusion of coagulable lymph takes place around the extremity of the fang, which becomes condensed into a sac, in the centre of which pus is formed. Dr Chapin Harris gives the same account of their formation. The other view regards the cyst as the result of local inflammation; that is to say, instead of extending over the whole fang, it is confined to certain parts of it. Where this has taken place, the periosteum becomes thickened, its attachment to the tooth is loosened, and pus is formed between the inflamed portion of the periosteum and the corresponding part of the fang.† Mr Tomes‡ speaks of these cysts as being the result of acute inflammation; but I believe, myself, that this is very rarely the case, and that they almost invariably depend upon long-continued chronic periostitis. M. Magitot*[^1] says that he has found that, in all instances, the dental canal has been obliterated in some part of its course; a circumstance which, he considers, serves to explain the production of a cyst; because if the dental canal had remained pervious, it would have allowed the pus to find an exit, and would have prevented its accumulation in a closed sac. That this may be the case sometimes is possible; but I feel convinced that it is not always so, as I have been enabled to pass a bristle through the whole length of the canal of a tooth which had a sac appended to the apex of its fang. All writers on Dental Surgery speak of the inner surface of the cyst as secreting the pus; but is it not probable that at least a portion of the pus is derived from the denuded surface of the fang? Such a result is perfectly in accordance with what we know of the pathology of other bones. Thus, for instance, when the periosteum becomes extensively detached from the surface of one of the long bones, that part of the bone is apt to lose its vitality and become a suppurating surface. The fang of the tooth from which the periosteum has been raised up and detached by the inflammatory process is in a similar condition; and when it is remembered that these parts of the fang are constantly found to be rough and irregular, it seems not unreasonable to attribute the irregular depressions to loss of substance in the outermost layers of the crusta petrosa.

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* *Opus cit.*, p. 218.

† Wedl's statement, that "the new formation in these cases must arise from the *alveolus*," appears to me quite untenable. See *Rudiments of Pathological Histology*, p. 48.

‡ *A Course of Lectures on Dental Physiology and Surgery*, p. 278.

M. Magitot says that the teeth which are most liable to these cysts are the antero-superior. I am not aware that we have any statistical records which will enable us to speak positively on this point; but, as far as my own experience goes, I have certainly met with them most frequently on the bicuspid and molar teeth; but whether in the upper or lower jaw, I cannot say.

I shall describe the structure of these cysts from one which I examined attached to the fang of an upper bicuspid. More than half the crown of the tooth was destroyed by caries; towards the apex of the fang, the periosteum was thickened; and at this portion a cyst, about the size of a pea, was attached by a narrow pedicle. Upon passing a bristle down the canal of the tooth, it pressed out what appeared to be remains of the pulp, and then passed out at the apex of the fang, but did not enter the sac. The outer surface of the cyst was of a whitish colour, and had the usual appearance of fibrous structures: the inner surface was softer, flocculent, and marked here and there with patches of a distinct yellow colour. The cyst was made up of fibrous structure; the fibres on the outer surface were loosely connected together, and could be torn away in slips; while towards the inner surface they formed a compact uniform structure, and were less easily separated: this difference might partly have arisen from the tooth having been placed in water. The inner surface contained a number of rather large cells filled with granules and nuclei, thus bearing a strong resemblance to epithelial cells. The yellow masses before alluded to were evidently composed of fatty matter; they were made up of cells filled with very minute transparent fat globules, and seem to indicate that the cyst was undergoing fatty degeneration. This idea was further substantiated by the fact that I could detect no pus globules. The sac had been opened and placed in water before examination; but this would not have removed all traces of pus, if any had been present. The contents consisted of a transparent fluid, and there were a few plates of cholesterin. I have selected this example because, while it serves to illustrate the usual anatomical characters of the cyst itself, it tends to show that even when the disease of the periosteum has advanced so far, yet that nature may occasionally set up a process of cure. I cannot help thinking that in this instance the base of the sac had become contracted by the periosteum gradually re-investing the denuded portion of the fang, that in this way the base of the sac had been converted into a narrow pedicle, that then the interior of the cyst had ceased to contain pus, and that a fatty degeneration had subsequently arisen in its interior, with the intention that it should ultimately be removed.

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* *Opus cit.*, p. 60.

DEFECTIVE PALATES.

A PAPER READ AT THE MONTHLY MEETING OF THE COLLEGE OF DENTISTS, TUESDAY, APRIL 2, 1861.

BY GEORGE WILLIAMS, M.C.D.E.

(Continued from page 211.)

The principles upon which obturators are made in the present day, are much the same as those which have been formerly adopted. Several improvements have nevertheless been introduced, especially in regard to the material of which such contrivances are made. The use of vulcanite must for the future entirely supersede that of bone, and in the vast majority of cases there can be no question that it is superior even to gold. The new material is lighter, and, at the same time, as far as our present experience goes, it is equally as durable as gold; it does not imbibe the fluids of the mouth, and therefore remains perfectly pure; in addition to these advantages, the mode of working this material is such, that a much more accurate fit can be produced than with gold, or at least a more complete adhesion to every point of the surface which the obturator is intended to cover.

Fissures of the palate may be divided into two series. In the one, the defect is confined to the hard palate; while in the other, the aperture is continued from the roof of the mouth through the whole or part of the soft palate.

Again, the first may consist of a simple fissure, or it may occupy nearly the whole of the palatal surface. Where there is only a moderate-sized opening in the hard palate, a surgical operation has succeeded in effecting a cure. My observations will now, however, be confined to the consideration of the instruments which are provided for obviating these unfortunate and distressing deformities.

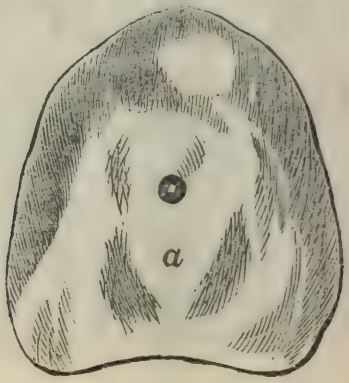
The existence of a communication between the cavity of the mouth and the nose permits the air to pass freely from the one to the other, and becomes a serious impediment to the utterance of articulate sounds, producing that peculiar nasal twang which proclaims to every one the misfortune which has befallen the speaker. In the next place, mastication and deglutition are equally difficult of accomplishment; since the movements of the tongue, in passing the food from the anterior to the posterior part of the mouth, unavoidably drives it into the nasal cavity. The object that the operator has in view is, therefore, to construct an instrument which, while it perfectly adapts itself to the margins of the aperture, shall project so far beyond them on to the palate as effectually to close up the opening, and do away with the unnatural communication between the mouth and the nose. In doing this, care must be taken that the apparatus shall press as little as possible on the sides of the aperture; since, should this be the case, it will superinduce absorption of the margins of the opening, and ultimately cause the defect in the palate to become worse than at first. Another point to be borne in mind, is not to encumber the mouth with a larger amount of material than is absolutely necessary. At the same time, I would remark that where the aperture is very large, and much of the natural parts has been lost, they may to a certain extent be supplied in the construction of the obturator; and by thus diminishing the undue size of the mouth cavity, the voice and pronunciation will be improved.

When the opening in the palate is of moderate size, all that is required is a disc or plate somewhat larger than the opening, which the patient can keep easily and securely in its place, and at the same time remove at his pleasure for the purpose of cleansing. An impression of the mouth having been taken, such a plate can be readily constructed either in vulcanite or gold, care being taken that its under or palatal surface shall be somewhat concave, so as to correspond to the natural arch of the palate. The next question is, how can such a plate be retained in position? I have here two obturators adapted to these cases constructed in vulcanite. In one of them, two upright slender pieces of the same material are attached to the upper side of the horizontal plate in such a manner that they exactly correspond to the sides of the opening in the palate at their bases, but somewhat diverge at the upper ends: these upright pieces, from being thin, are elastic, and exert just sufficient pressure on the sides of the opening to retain the obturator in its place. In the other obturator, a solid pillar of vulcanite rises up from its palatal surface, and passes through the opening in the roof of the mouth: this projecting piece is grooved at its sides, so that when the obturator is arranged in its proper position, the pillar fills up the opening in the palate, and the grooved surface slightly overhangs the maring of the fissures.

In some of the old obturators, a very complicated arrangement of moveable flaps or wings was made use of. These appendages could be closed or opened by the action of a screw or other contrivance. When an obturator of this kind was being placed in the mouth, the moveable pieces were folded over each other; but when it was inserted into the opening in the palate, then the flaps were expanded in the interior of the cavity, and thus retained the obturator in its place. All such intricate contrivances are unnecessary, and indeed to be condemned; nor should I have referred to them, but for the purpose of calling your attention to one which I constructed in compliance with the request of a patient. The arrangement is certainly ingenious, but possesses no advantage over the simpler forms which I have just described, and is far more liable to get out of order.

In this case the patient had had a similar obturator made for him in Germany, and at that time preferred it to any other. Subsequently I induced him to wear an obturator constructed after the manner of the first simple form which I have already mentioned; and eventually he has substituted this for the following more complicated arrangement.

This obturator was constructed in gold, and consists of a horizontal plate (*a*, fig. 1), of the usual form and size, for



the purpose of covering the opening in the palate: the only difference is the presence of a small perforation in the centre, leading into a short hollow cylinder (*b*, fig. 2), attached to the opposite side of the plate. A small screw, about an inch long, works within the cylinder, by means of a watch-key, which is made use of from the surface of the obturator looking towards the mouth. Attached by hinges to the palatal side of the obturator are two upright pieces of the same length as the screw; two other pieces are attached in like manner to the upper ends of the uprights, and pass inwards towards the screw, but do not reach so far. What is wanting in the length of the horizontal arms is made up by a flat piece having a female screw in its centre corresponding to the male screw which has been previously mentioned as working in the cylinder attached to the upper side of the obturator. This central piece is itself attached to the horizontal arms by a hinge on either side. The effect of this arrangement is to allow the central piece to be moved up and down the thread of the screw by means of the watch-key. When the central plate is placed at the summit of the screw, the lateral arms are arranged horizontally, and the two uprights are thrust out of the perpendicular, so that their upper ends incline away from the screw, and are somewhat wider apart than those which are attached to the plate covering up the fissure in the palate. On the contrary, when the central piece is moved down to the bottom of the screw, the attached ends of the horizontal arms are carried with it, while at the same time the uprights fall inwards towards the centre, and now occupy a narrower space at their upper extremities than where they are attached to the plate. This description will be best understood by reference to the accompanying drawing, where *a*, fig. 1, represents the surface of the obturator next the mouth, with the opening into the cylinder within which the screw works. Fig. 2 represents the palatal surface of

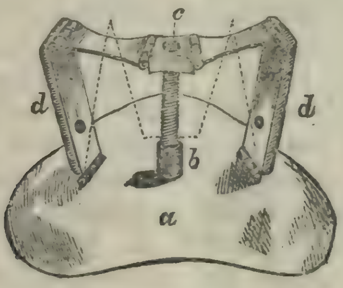


Fig. 2.

the obturator; *d d* represent the uprights and the horizontal arms attached to each other and the plate of the obturator by moveable hinges; and *c*, the central piece which works upon the screw. The dotted lines show the relative position of the parts when the piece *c* has been brought down to the bottom of the screw. It is while in this condition that the obturator is placed into the fissure of the palate; the screw is then worked until the central piece, *c*, is brought to its summit; the upper extremity of the uprights then occupy a wider space than their bases, which exactly correspond to the transverse width of the fissure: the effect of this is to retain the obturator in place. In order to prevent any unnecessary pressure on the sides of the palatal opening, the outer surface of the two uprights was covered with a thin layer of gutta-percha.

When the palatal opening is very large, a somewhat more complicated apparatus is required than either of the two which I first described. In these cases it is desirable to extend the plate of the obturator to the backs of the teeth, and, if possible, to have bands passing over their buccal surfaces, as in the case of plates supporting artificial teeth. It frequently happens that some of the teeth are wanting, especially the molars and bicuspids: when this is the case, advantage may be taken of it for two purposes—first, to secure the obturator; and, secondly, to make this the means of supporting artificial teeth. Such an arrangement would correspond to that part of fig. 3 which covers the hard palate.

I pass on next to the consideration of those more complicated cases where the defect is not confined to the hard palate, but extends more or less through the soft palate, and in some cases entirely through that and the uvula. It is one of these extreme cases that I shall select for the purpose of illustration. The treatment of these cases is far more difficult than those which have been previously described, and requires more patience and perseverance on the part of the patient. The irritability of the parts at the back of the mouth is well known, and most of us have at one time or another experienced considerable difficulty in obtaining a correct impression of the patient's mouth from this circumstance. In some persons, no sooner are the arches of the soft palate touched than a most unpleasant sensation of nausea is experienced; the irritation is propagated to the stomach, and an irresistible tendency to vomit is produced. I do not know that the fissured is more irritable than the natural palate; but the necessity of obtaining an impression so far back in the mouth will, in almost every case, give rise to these unpleasant sensations, and adds greatly to the difficulty of procuring a correct impression of the parts. I have found this irritability greatest in females; and to guard as much as possible against its occurrence, I direct the patient to accustom the parts to the contact of foreign bodies, by touching them with his fingers. If this is persevered in for some days before seeing the patient, the irritability of the part will be considerably diminished, and the operator will have a much greater chance of succeeding. I have also found it useful, in some cases, to administer a small quantity of citric acid, or a few drops of creosote, in half a tumbler of water, immediately before taking the impression.

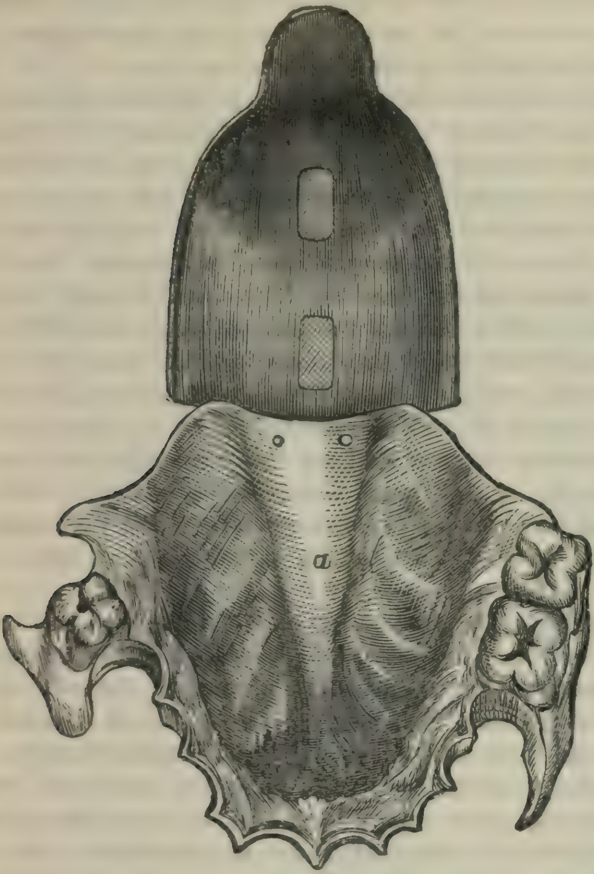


Fig. 3.

In order to obtain a correct impression of the mouth, it will be necessary to construct a suitable impression-tray. This may be done by attaching to the centre of the ordinary palate tray a piece of boxwood, filed up in shape to correspond with the concavity of the mouth, and extending some distance towards the velum. It is also important that the impression should extend as far back as the margin of the hard palate, and, if possible, somewhat beyond. From this impression a model is made in plaster of Paris, to which a vulcanite plate is fitted to cover the entire surface of the hard palate. The piece must then be adjusted to the mouth, in order to obtain the form and relative position of that part of the velum which is deficient. This cannot be done in the usual way, by means of wax, owing to the soft and yielding nature of the parts. I have, however, succeeded by taking a strip of plumber's lead, as near as possible the width of the fissure in the velum, and, after bending it over the front teeth, and pressing it along the palate until it reaches the back part of the mouth, then bending it until it obtains the curve and direction which the velum naturally possesses. This proceeding will require some little time and patience, and the lead will often have to be removed in order to trim and adjust it to the fissure; but too much care cannot be bestowed upon this part of the operation, since upon it depends the comfort and utility of the artificial velum.

Before applying the strip of lead, a portion of wax should be placed on the palatal surface of the vulcanite: by this means a groove may be formed, into which the lead can be fitted, to enable the operator to restore it to its proper position in the mouth, after it has been removed for the purpose of making any alteration. When the piece with the strip of lead is removed from the mouth, it must be placed on the model. The model must then be made up by adding plaster behind the strip of lead, which will give us as correct a representation of the fissure as it is possible to procure.

The material which I have found best adapted for the artificial velum, is a piece of soft vulcanite, made in form and shape to cover the fissure, and secured to the vulcanite, forming the hard palate (*a*, fig. 3) by a strip of elastic gold, which is fastened at one end by rivets to the upper surface of the hard vulcanite, and then passes behind the soft vulcanite, to which it is also secured by rivets.

I have thus endeavoured to lay before you, in as concise a manner as possible, the best mode of constructing artificial palates. I am quite aware that many other forms of obturation have been introduced at various times; but those which I have described will, I believe, be found to answer in all ordinary cases. My wish has been rather to embody the practical results of our past experience, than to enter into a long and minute description of now obsolete and useless forms of these contrivances. In furtherance of these objects, I trust that those present will favour me with their experience in these matters, hoping thereby to add to my knowledge; believing the adage is always applicable, that "he who is too old to learn, is not fit to teach."

ON SYMPATHETIC NERVOUS AFFECTIONS CONNECTED WITH THE TEETH.

A PAPER READ AT THE MONTHLY MEETING OF THE COLLEGE OF DENTISTS, MAY 7, 1861,

BY H. T. KEMPTON, M.C.D. Eng., F.L.S.

(Concluded from page 252.)

Dr Ashburner, in the work already referred to, has recorded an instance in which the derangement was such as to threaten insanity.

CASE 2.—A young gentleman, of light hair and eyes, of a strumous temperament, seventeen years of age, had a faint and very peculiar odour of breath. His mind was excited by several harassing considerations, and he was attacked by delirium. Violent conduct, and a desire to destroy numerous objects that came in his way, were the manifestations of aberrant intellect. In other respects his spirits were extremely high, and he was full of fun and joyousness; but the uncontrollable desire of mischief rendered it advisable to put him under restraint. One of the most experienced physicians of the Metropolis decided upon the hopelessness of a cure in this case; and the opinion was founded upon a range of facts with which it falls to the lot of very few to be conversant.

I one day persuaded this patient to allow me to use my gum lancet freely upon some larger spaces of gum covering developing dentes sapientiæ. In a week afterwards I heard that he was quite well.

What was threatened in the previous case actually occurred in the following, which was related by Esquirol to Dr Toirac.

Case 3.—An insane lady was brought to Esquirol's establishment, who recovered her reason after a crucial incision had been made on the gum to allow the development of the wisdom tooth.

The two following cases are recorded by the celebrated American Physician Dr Rush.

Case 4.—"Some time in the month of October 1801, I attended Miss O. C. with rheumatism in her hip-joint, which yielded for a while to the several remedies for that disease. In the month of November it returned with great violence, accompanied with a severe toothache. Suspecting the rheumatic affection was excited by the pain in her tooth, I directed it to be extracted. The rheumatism immediately left her hip, and she recovered in a few days. She has continued ever since to be free from it."

Case 5.—"Some time in the year 1801, I was consulted by the father of a young gentleman in Baltimore who had been affected with epilepsy. I inquired into the state of his teeth, and was informed that several of them in his upper jaw were very much decayed. I directed them to be extracted, and advised him afterwards to lose a few ounces of blood at any time when he felt the premonitory symptoms of a recurrence of his fits. He followed my advice; in consequence of which I had lately the pleasure of hearing from his brother that he was perfectly cured."

Mr Tomes, in his recent work on Dental Surgery, has recorded a similar case.

Case 6.—A lad, a farm-labourer from Windsor, was admitted into the Hospital for Epilepsy. The usual remedies were tried for six weeks without effect. His mouth was then examined, and the molar teeth of the lower jaw were found to be much decayed; and of some of these the fangs only remained. He did not complain of pain in the diseased teeth, or in the jaw. The decayed teeth were, however, removed, and the fangs of each were found to be enlarged and bulbous from exostosis. During the eighteen months that succeeded the removal of the diseased teeth, he had not suffered from a single fit, though for many weeks previous to the operation he had two or three a day. The boy was free from any other disease.

Some short time back, the following example of nervous irritation, extending to the whole side of the body on which the diseased tooth was situated, occurred in a patient of my own.

Case 7.—The Rev. H. K. had been troubled for some months previous to my seeing him with pain on the left side of the head and face. The intensity of the pain varied, sometimes being exceedingly acute and accompanied with considerable swelling of the face. These pains appeared to commence in the canine tooth on the left side of the upper jaw; not only did they extend over the whole of that side of the head and face, but they were accompanied with a sensation of numbness in the arm and leg on the same side of the body. The canine tooth was very much worn away on the crown by the action of the lower teeth in mastication, but in other respects it appeared to be a perfectly healthy tooth As the pains had already continued for some months, and there did not seem any probability of their ceasing, I extracted the canine. The operation was perfectly successful; and the patient has not only remained free from pain, but has lost all sensation of numbness in the arm and leg. The tooth was very firmly adherent to the socket, so much so that some of it came away with the tooth when it was extracted, and even out of the mouth could only be removed from the surface of the fang by the use of considerable force. Upon examining the fang, I found a considerable bulging on one side arising from exostosis, and I feel no doubt that this was the source of the nervous affection from which the patient had now been suffering for some months.

Dr Richardson has given a well-marked instance of hysteria dependent upon the presence of a carious tooth.*

Case 8.—A lady was engaged in preparing a ball-room for visitors in the evening. She had been some days before in indifferent health, with tendency to hysterical paroxysm. In the midst of her occupation, she suddenly uttered a piercing cry, and in an instant was frantic with agony. There was no mistaking the fact of suffering; for every limb shuddered, and cold sweat bedewed the cold face, which was distorted with pain. In the intensity of her anxiety, she tore up everything in her way, and neither reason nor persuasion could for a moment influence the frantic expression of a torture which seemed unendurable. The seat of the pain was a carious tooth in the upper jaw, the first molar, a tooth which for a long time past had given no anxiety or trouble. From this point the pain seemed to extend all over the body, but in the tooth it was concentrated. On the application of chloroform to the cavity of the tooth, the pain as suddenly ceased, leaving the patient as free from pain as at any previous period. Afterwards, however, for the succeeding one or two weeks, there were occasional smart returns of the ache, with equally rapid subsidence on the application of a narcotic.

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* *The Medical History and Treatment of Diseases of the Teeth*, by B. W. Richardson, M.A., M.D., p. 86. London, 1860.

In these cases there was positive disease in the teeth ; but in the following, which was published in the 'Lancet' of 1859 by Mr Hancock, with some other cases to which I shall presently refer, there was no apparent disease whatever of the teeth, but simply want of room.

Case 9.—A gentleman, aged thirty, was sent to me for lockjaw and pain under the right ear. He could only separate his jaws for about half an inch in front, and had been in that state for nearly twelve months. He attributed the mischief to cold, and had been subjected to various kinds of treatment, including leeching, blistering, &c., without benefit. Upon careful examination, I observed that his teeth were much crowded and wedged closely together, particularly in the upper jaw, and concluded that to be the cause of suffering. I accordingly requested Mr Alfred Canton to see him with me. He extracted one of the anterior molar teeth from the upper jaw. The tooth was very large, but perfectly sound, and the patient returned home in the course of a week cured.

The last case which I shall mention in connection with this division of my subject is one of partial paralysis.

Case 10.—A French gentleman, about nineteen years of age, of a florid complexion, and of a remarkably healthy appearance, had been for some time affected with a slight degree of loss of power in the right arm, with occasional pain, of that peculiar tingling kind which is produced by pressure upon a nerve. At length he observed that an accession of one of these attacks was accompanied with an acute pain in the second molar tooth in the lower jaw on the same side. This led to a more attentive observation of subsequent recurrences of the pain, and he found that whenever the tooth was pressed or irritated, the sensation in the arm returned. The tooth was extracted, and the complaint, though not immediately, was permanently cured.*

These examples might easily be multiplied, but sufficient have been brought forward to show that abnormal development or disease of the teeth may set up nervous irritation, which will meet with a sympathetic response in the sensorium itself, or become propagated through the medium of the sensorium to other and remote parts of the body, along the course of nervous trunks, which, on a superficial examination, appear to be totally unconnected with the dental nerves. I proceed next to speak of some similar effects produced by the teeth upon the organs of vision and hearing: first, of those of vision.

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* *The Anatomy, Physiology, and Diseases of the Teeth,* by Thomas Bell, F.R.C.S., p. 324, 2nd edit.

In the 'Dublin Medical Free Press' the following case is recorded:

Case 11.—A man consulted Dr Emmeuch for a painful affection of one of his eyes, which had lasted fourteen years. There were considerable vascularity of the parts, a continual flow of tears, with pain and intolerance of light. All these symptoms were greatly aggravated by any indiscretion in diet, and the use of the slightest stimulus, such as a single glass of wine. All kinds of remedies had been tried in vain at different times, and the affection seemed incurable. On examination of the upper jaw, Dr E. found a carious tooth on the side corresponding to that of the affected eye. The tooth was extracted, and almost immediately afterwards the symptoms relating to the eye began to subside, and soon entirely disappeared.

Mr Henry has kindly favoured me with a translation from the German of some observations made by Dr Tierlinck in the 'Transactions of the Medical Society of Ghent;' but only two of these cases bear immediately upon the present subject, most of them consisting of instances in which the eye became affected through the inflammation which either accompanied diseased teeth, or followed their extraction. The two following, however, are instances of purely sympathetic affections arising from irritation of the nerve.

Case 12—A young man suffering with violent toothache, had the first upper bicuspid extracted. The operation was very simple, and the tooth was perfectly removed; but the patient asserted that he experienced violent pain in the eye of the same side, and on the following day he went anxiously to his medical adviser, assuring him that the sight of it was affected. On examination, it was discovered that the pupil was very much dilated, but this was the only diagnostic sign evident. A card punctured with a needle was held before the eye of the patient, which immediately enabled him to distinguish surrounding objects, thus showing that there was merely preternatural dilatation of the pupil, without structural change, admitting too many rays of light, and thus hindering the appreciation of objects. Pledgets of lint, saturated with extract of opium, placed in the alveolus, and an opiate ointment applied to the cheek, sufficed to remove the dilatation of the pupil and restore the sight.

Case 13—A lady was suffering from defective vision. By one adviser it had been set down as cataract, by another it was attributed to intermittent ophthalmia, and a third regarded it as amaurosis Dr Tierlink, after giving his opinion as to the judgment of these gentlemen being erroneous, examined the mouth, and expressed his belief that the cause of her complaint originated in a carious stump, which had been a source of irritation to the fifth nerve. The stump was extracted, giving instant relief from pain ; the flow of tears subsided, and the sight was gradually restored.

Mr Hancock has recorded three cases in the 'Lancet' for January 23rd, 1859, in which the affection of the eye originated in diseased teeth.

Case 14.—J. K., aged eleven, was admitted into Charing-cross Hospital, Nov. 11th, 1854. About a month previously, upon waking one morning, he found he was entirely blind. Previously he had nothing the matter with the eyes, and when he went to bed on the preceding night could see distinctly. He consulted a surgeon in the country, who prescribed medicines, blisters, and subsequently cupping; but as he did not derive benefit therefrom, he was, at the expiration of a month, sent to the hospital. The pupils were dilated, fixed, and uninfluenced by light, which he could not distinguish from darkness. The suddenness of the attack, and the absence of the usual premonitory symptoms, led Mr Hancock to conclude that the mischief was functional rather than structural, and he therefore examined the teeth. These organs were found to be much crowded and wedged together—the jaws, in fact, not being sufficiently large for them. On the 17th November, two permanent and four milk molar teeth were extracted. On the same evening the boy could distinguish light from darkness, and on the following morning could make out objects. From this time his sight rapidly improved, and he was dismissed cured on the 28th, the only treatment beyond the removal of the teeth being two doses of aperient medicine.

In the following case the amaurosis had lasted for six or eight months, and the patient had been subjected to the usual treatment for that disease.

Case 15.—A man applied at the Royal Westminster Ophthalmic Hospital for total blindness of the right eye of eight months' duration. The attack came on quite suddenly, not having been preceded by pain, muscæ, flashes of fire, or any of the usual precursors of amaurosis. He could distinguish light from darkness ; the pupil was dilated and fixed. The various remedies for amaurosis had already been employed in the country without success. On examining the mouth, the second molar in the right upper jaw was found to be much decayed. This was extracted, and the patient desired to attend at the hospital in two days. At his next visit, he could see, and was able to distinguish objects, though not very clearly. In the course of a few days, he returned to the country well. He had no other treatment beyond the extraction of the tooth.

The next case was one of strabismus, with falling of the upper eyelid.

Case 16.—H. R., aged twenty-nine, a native of Hereford, was admitted into the Westminster Ophthalmic Hospital on July 3rd, 1858. The strabismus had existed for three years. The ptosis was of recent date,—about a fortnight's duration. The left eye was quite closed. The mischief came on suddenly, without pain either in the head or eye. The patient was ordered compound iron mixture, one ounce thrice daily, with an aperient occasionally at bed-time. This was continued until July 12th, when she was no better. The mouth was examined, and two molar teeth on the left side of the upper jaw were found decayed. The patient declared that they caused her no pain; but they were ordered to be extracted, which was done. Two days after, the ptosis was much better, and in two days more it had assumed an intermittent character. The eye was quite open in the morning, but towards noon the lid drooped and did not resume its proper position until the evening. The patient was ordered five grains of sulphate of quinine twice a day. In four days more, the ptosis was cured, the strabismus better, and so slight as not to require an operation. The patient remained in the house three or four weeks longer, when she was discharged cured.

Only a short time ago, the following case occurred in my own practice:

Case 17.—Mrs F. H. called upon me for advice, having suffered severely for the last fortnight with violent pain in the right temple, extending down the neck, at times affecting the whole of that side of the face, and accompanied with darting pains in the eyeball. The only relief she obtained from her sufferings was by the application of ice to the side of the head, and by holding cold water in the mouth. At the time of her visit, the patient was in no pain, but had had a severe attack that morning. She had not suffered from her teeth during this neuralgic affection. On examining the mouth, I found the lower dens sapientiæ on the right side very much decayed on its anterior and external surface. On tapping this tooth smartly, there was no pain; yet I felt convinced, from the state of the tooth and the inflamed condition of the gum, that it was the exciting cause of the neuralgia. The patient very reluctantly consented to the extraction of the tooth. At the moment of the operation, she experienced a violent paroxysm of pain over the whole of the right side of the head, which lasted several seconds: there was no pain in the part from whence the tooth was extracted. The operation was attended with a moderate amount of hæmorrhage, and the pain soon ceased. The patient has since continued perfectly free from all symptoms of neuralgia.

Similar cases to the above have been recorded by other writers, but those I have mentioned illustrate the ophthalmic affections which the teeth most frequently set up. These are amaurosis, strabismus, and spasmodic affections, or loss of power in the eyelids. The strabismus and the amaurosis are characterised by coming on suddenly, and the latter also by the absence of structural changes in the eye.

It is most important to remember that, in connection with these ophthalmic affections, it is by no means necessary that the diseased teeth should be the actual seat of pain.

The last subject to which I shall call your attention, is the influence which a morbid condition of the teeth is capable of exercising over the ear. One of the commonest examples of sympathy between the ear and the teeth is instanced in the sensations which are felt in the teeth when certain sounds grate upon the ear—a sensation commonly known as a setting the teeth on edge. It frequently happens that decayed teeth bring on a sudden attack of pain in the ear, which is often referred to the effects of cold. This sympathy between these organs is often alluded to by the older writers, and even formed the basis upon which they founded their treatment. Thus Ambrose Paré, after enumerating several remedies for toothache, tells us that if these do not succeed, to drop oil of castoreum or oil of cloves into the ear, and use vesicatories under the ear. The following cases illustrative of this part of my subject came under the notice of Mr Harvey, at the Dispensary for Diseases of the Ear.

Case 18.—H. L., aged twenty-two, a lawyer's clerk, had suffered from neuralgic pains in his ear for more than three years : they were accompanied with an occasional fetid discharge. The neuralgic paroxysm generally lasted for some hours. The principal seat of pain was directed towards the last molar tooth on the left side, and the dens sapientiæ was found to be defective. After this tooth was extracted—an operation which was performed with some difficulty—the discharge stopped, and the patient lost all his neuralgic pains. Until the teeth were examined, the pain was attributed to rheumatism.

Case 19.—Mrs H., a delicate female, had been the subject of neuralgia in the ear and face, accompanied with deafness, for twelve months. Upon examining the mouth, the two last molar teeth were found to be defective on the same side. These teeth were extracted, and some medical treatment adopted : she soon recovered her hearing, and permanently lost the neuralgia.

I have thus, Sir, endeavoured to bring before the meeting illustrations of those nervous affections which may arise from the presence of irregular or diseased teeth in the mouth. I am aware that there are many other disorders even of a more serious and dangerous character than those to which I have called your attention which originate in a similar manner; but in those cases the connection between the disease and its exciting cause is so strongly marked, that even the most superficial observer cannot fail to connect them together. If inflammation spreads from a tooth and involves the neighbouring structures, yet the state of the tooth clearly points to the original seat of the disorder; or if a tumour arises, it is found to commence in the immediate vicinity of the diseased tooth. This is not the case with affections which are propagated through those intricate combinations of the nervous fibres which I pointed out at the commencement of the present paper. The cases I have recorded sufficiently prove the existence of these peculiar forms of tooth disease, and strongly suggest the propriety, in all doubtful cases, of carefully investigating the condition of the dental organs.

THE DENTAL REVIEW.

LONDON, JULY, 1861.

We publish in the current number of the Dental Review a series of charges made against the College of Dentists by the 'Lancet,' as well as a reply to those charges by the esteemed President of the College, at the instance of the Council. A more serious attack against our independent Institution was perhaps never before made; but in the main it has done immense good, inasmuch as it has enabled the President in his reply not only to refute, line upon line and statement upon statement, the attack that has been opened, but to show, without any ostentation or exaggeration, what the College really has done, and what are its true objects and constitution.

The writer of the article in our contemporary does not in any way impugn the right of the independent Members of the Dental Profession to organise themselves into a distinct body, for the advancement, political and scientific, of the science and practice of their Profession: but knowing, undoubtedly, that such a course would expose him to the suspicion of tyrannical temper, and exalt those whom he opposes to the sympathy of all liberal-minded men, he admits in general terms the right, and founds his diatribe on certain acts of omission, rather than commission, which the College of Dentists has, he says, most wickedly allowed. Even in this respect he can find the College guilty of but one sin; and that is, that the the Council of the College has admitted and does admit to its membership men who use the name and influence of the College for trade purposes and advertisements. To this charge, the President, Mr WAITE, has written a reply; which reply, at once temperate and argumentative, contains, as our readers will see, a logical and complete defence of the College against the reproaches cast upon it. For the language in which they have spoken, for the simple but truthful appeal which they have made, Mr WAITE and his colleagues deserve our best commendation. Their duty was at once easy and straightforward; and they have acted up to that duty, without either exaggeration or hesitation. The College of Dentists is governed on the basis of all representative institutions, by the voice of the majority of its own members: it therefore is constituted in accordance with other analogous institutions, and is in perfect harmony with the spirit of English feeling and action. It has not, as has been asserted, admitted to its membership any one who at the time of admission was advertising contrary to its laws: it has refused within these last months at least three applicants because they were advertising contrarily to the laws; and, more than all, its Council has positively taken off two names from the list of members for this self-same breach of laws, and has made it a condition of membership that every person admitted shall sign a declaration to the effect that he, the said candidate, will keep to the strict letter of the laws, and to the spirit which they convey.

Further than this, as Mr WAITE observes, the Council cannot do: it is the full extent of pressure that can be put on. As individuals, the Members of the Council may and do condemn the advertising practice; unitedly and officially, their duties are obviously limited to the extent we have named.

But that which adds most weight to the arguments of the

College of Dentists, is the fact that, in the attempt to suppress objectionable practices, its executive has positively exceeded in act the executives of the chartered bodies. If the newly-appointed Board of Examiners in Dentistry at the College of Surgeons will apply, in its arbitrary discretion of election of Certificiates, a rigid system of exclusion, directed against men whose characters may be considered as forfeited, either by the commission of offences against divine as well as human and instinctive laws, or by the more paltry offence of advertising their wares and accomplishments, then the College of Dentists might, if at any time it slipped from the same stern duty, be corrected by the measure of a standard at once undeviating and virtuous. But, until such a standard is set up, is not the least that is said by the advocates of the Certificate system soonest mended, both for themselves and for all with whom they would zealously and affectionately claim brotherhood ?

As respects the position taken by the 'Lancet,' we need express neither regret nor anxiety; for it is, as it has ever been, the law, that that which is unjustly presented to the world, is invariably rejected by the world under the correction of time and fact. Nay, if the truth were now all out, we dare predict that the very attack made upon the independent Dentists was rather an accidental shot by an enemy, than the carefully-considered and conscientious conviction of the principal and the able conductor of the journal from which the shot was levelled.

The appointment of Mr J. Cox Smith as Dentist to Her Majesty's Military Hospital of Fort Pitt, Chatham, appears to be regarded with uneasy feeling by our contemporary, who lately stated, on the strength of "private information," that there had been no such appointment made. In the last number of the 'British Journal of Dental Science,' Mr Smith, in a note addressed to the Editor, tells him that he could have obtained information of a contrary nature by applying to the Director-General of the Army Medical Department, or to the principal Medical Officer at Fort Pitt. The Editor appends to Mr Smith's note some lengthy and most uncourteous remarks of his own, calling on Mr Smith to prove that he holds the appointment. Surely, after Mr Cox Smith's previous assertions, it is for the Editor to prove that he has it not.

As the matter stands at present, Mr Cox Smith, on his own testimony, is Dentist to Fort Pitt: on the Editor's testimony, he is not. The one is a gentleman known to us all; the other, a writer whose previous false statements have been sufficiently often exposed. The Profession will not be at a loss to judge between the two.

SELECTED ARTICLES.

DENTITION AND ITS DERANGEMENTS.

By A. Jacobi, M.D., Prof. of Infantile Pathology and Therapeutics.

(From the 'American Medical Times.')

(Continued from page 219.)

Lecture III.

The enamel of the teeth is subject to several anomalies. It may be either defective or discolored. Its defective formation appears either in excavations dispersed over the surface of the tooth, or there are complete furrows or transversal notches around the crown of the tooth, the body being still covered with or entirely deprived of enamel. This atrophy is the result of those severe diseases which the child may have been suffering from during the development of the enamel. Acute exanthems are said to produce the dispersed excavations; acute inflammatory diseases, the furrows; and rachitis has often been observed to be the cause of the entire absence of the enamel. The incisors of rachitic children are usually small, appear late, and are very liable to become carious. Acute exanthems are counted among the causes of this anomaly, especially by such writers as classify the teeth with the dermal tissue. Small-pox is related to produce isolated excavations which have a great similarity to the cicatrices remaining after small-pox. To vaccination also some have attributed the defective development of the enamel. Such children as were vaccinated before any tooth appeared, or after their complete development, had finer teeth than those who were vaccinated during their protrusion and growth.

According to Prof. Nessel, the age can be determined in which a child was affected with a severe disease, from the species of teeth affected, and the distance from the top of the crown in which excavations or furrows are found. If the incisors and the first molars are defective in enamel, the disease ran its course between the twelfth and eighteenth months ; whereas a disease of the fourth or fifth year will leave its vestiges in the second molars. The longer its duration, the broader the furrows. When disease returns at different periods, there are often furrows at different heights. Prof. Nessel is of the opinion that this abnormal condition is the effect of a severe disease, influencing as well the membrane outside the ivory, from which the enamel is deposited, as any other part of the organism, but does not depend on supposed abnormal acidity of the liquid contained in the dental sac. For if this were the cause, we should expect the enamel to be defective all over below the line that was formed before the disease occurred. Whichever may be the cause, the anomaly cannot be removed. It would be aggravated by levelling the surface of the tooth, as extensive caries would be the immediate consequence.

Another anomaly of the enamel is its discoloration. Brownish spots are the result of original development and composition. White spots are sometimes the effects of mechanical injuries, producing local disorganisation of the enamel. They consist of carbonate of lime instead of the phosphate and fluate, and from the fragility of the enamel at these places are apt to give rise to carious degeneration.

The anomalies described cannot be mistaken for those irregularities of shape, such as furrows extending around a whole tooth, which are sometimes observed as family peculiarities. Such teeth are generally hard and solid ; have very little tendency to become carious or wear prematurely, and differ widely from those soft and friable teeth which are due to the arrest of development in early infancy, by either hereditary disposition, or accidentally-contracted severe disease, or protracted mal-nutrition.

To Mr Hutchinson, of London, the profession is indebted for a number of good observations on the influence of hereditary syphilis on the development of the teeth. Although the majority of his remarks relate to the permanent teeth, in which this hereditary malady exhibits itself best, there are some morbid symptoms in the temporary teeth belonging to this class. The temporary teeth in hereditary syphilis do not present any peculiarities of form : they are, however, often of bad colour, and are very liable to early decay. The central upper incisors are the first to suffer from caries, and often crumble away under its influence, within a year of their being cut. The upper lateral incisors soon follow, but the canines very rarely indeed. The caries generally attacks the neck of the tooth, and rapidly penetrates through it, causing the crown to crumble away, soon after which the fang falls out. Children who have suffered severely from syphilitic stomatitis are often toothless as regards the whole of the upper incisors, from the second year till the permanent set are cut. Occasionally, the lower incisors suffer in the same way, but far more seldom than the upper ones. The deciduous canines rarely either become carious or drop out. They are, however, liable to a curious kind of circular wearing away, a sort of tusk or peg remaining in the centre of each tooth; the process of circular attrition having commenced a little above the level of the dental neck. This condition Mr Hutchinson has seen in but five or six cases, and in all these it was symmetrical on both sides, and in both upper and lower sets; he has never yet seen it excepting in syphilitic children. It is not usually produced in any very morbid degree until about the age of six or eight years. He has met with an approach to it in one of the molar teeth of a syphilitic child. The outer layer must, at least, be of a peculiar and abnormal softness to be worn away so singularly.

Original disposition is not an uncommon cause of the enamel being deposited in a thin transparent layer only. The children in whom it occurs are usually of weak and feeble constitution, and particularly defective as to the development of their osseous system in general. Transparency of teeth according to Rudolph, and bluish-white colour according to Duval, are symptoms of rachitis; semi-transparency, as of horn, of herpetic predisposition; semi-transparency and milk-white colour, of scrofula and tubercles; yellow and white spots, intermingled, with derangement of general development; small, white, yellow, or brown spots, of commencing caries. Yellowish-white colour, and average hardness, are found in the most durable and solid teeth.

There is one agent the influence of which appears to be particularly dangerous. I allude to sugar. It has long been considered by physicians and the public as the cause of many cases of caries of the teeth. Its tendency to be transformed into acid is well known. Every acid is liable to disorganise the enamel of the teeth. It is proven by direct experiments that sugar dissolved in water, and exposed to a certain temperature and a continued afflux of atmospheric air, would not disorganise enamel, although this were kept in the solution for many weeks after the transformation of sugar into acid has taken place. There is, however, a difference in the transposition of sugar, according to whether it takes place in a tumbler or on the teeth. The change is more rapid on the teeth than otherwise, from the fact that the air is constantly renewed in the mouth. Thus it is that the enamel of the anterior side of a tooth is more often affected first; for the common observation is, that the anterior and lateral surfaces of the teeth are affected, badly developed, cracked, or their enamel entirely absent, while the posterior surface is proportionally uninjured. Slight though the effect may be for some time, it will prove dangerous to the normal condition of the tooth whenever frequent repetitions of the same injury take place. However this may be, this is certain, that there are some writers who deny the injurious effect of the sugar on the teeth, from the fact that the negroes on sugar plantations have the most beautiful and strongest teeth. Perhaps the lime which is usually contained in refined sugar has something to do with the deleterious influence on the dental structure. Such, at least, is the opinion of Hille, who observed both negroes and creoles of Surinam to have beautiful and white teeth, although they are constantly using sugar, but unrefined. The same author, however, adds the remark, that the unrefined sugar also is not prepared without lime; but he is inclined to attribute the health of the teeth to the absence of scrofula in that island. In the Netherlands he found, together with the general prevalence of scrofulous diseases, early decay of teeth. Falck, in his researches on diabetes mellitus, observed caries of the teeth in many instances: he does not attribute this anomaly to the direct influence of sugar, but to its transformation into lactic acid. This transformation takes place readily by the action of saliva, which is generally found to be acid in persons suffering from diabetes.

Fruit, both sour and sweet, are known to destroy the dental structure. Even in adults the same disastrous result is observed. Therefore, in allowing fruit to children, Spielberger's advice is very good,—viz , Let the juice be absorbed, or removed from the teeth, by the simultaneous use of either bread or water.

One of the most injurious agents in destroying the teeth is the sudden change of temperature. Of the different layers, enamel, ivory, &c., a sudden change of temperature will affect more the outer than the inner one; the enamel will be liable to crack without being thrown off, as there is an organic connection between enamel and ivory; but in the cracks, acids, or any other injurious substance, will succeed more rapidly in disorganising the structure.

As mal-nutrition is among the principal causes affecting the healthy composition of teeth, it is necessary to know the kind of food which is proper for children before and during dentition. Previous to the eruption of the first teeth, infants do not masticate; consequently, as a uniform rule, the food must be such as does not require mastication. Milk and soups are appropriate to this age. Amylaceous substances must be avoided, at least as a general nourishment, for a number of months; with the exception of those cases in which, for professional purposes, you think proper to allow them. Saliva, which is absolutely necessary for their digestion, is secreted in too small quantities in the very first months of life: thus the digestion of arrowroot, and farina, and rice-flour, and all the other amylacea, is thrown upon the digestive powers of the stomach, then undeveloped in its muscular structure, and unprepared, from the amount and kind of its secretions, for difficult digestion. If you cannot expect amylaceous matters to be readily digested, even when suspended in water and milk, how much less in a dry form, without the admixture of any liquid, as it is frequently given! Frequently the instinct of the mother is seen to correct, in some manner, the insufficiency of infantile digestion, by first masticating and soaking with her own saliva the bread, or cracker, &c., destined for her infant. This is an aid to infantile digestion, certainly, but it is a singular method of improving on nature's functions.

At the period of the eruption of the first teeth, the child first succeeds in performing the movements of mastication, and about the same time the salivary glands attain a higher development and exhibit a larger amount of secretion. It appears then, as a direct consequence, that amylaceous food, in moderate quantity, and well soaked, will prove digestible.

After the molar teeth have made their appearance, in the third and fourth half-years of infantile life, a great change occurs. The salivary glands are developed, the muscles of the infantile stomach strengthened, its digestive powers increased; and about this time more solid food is well borne, and may be allowed. Not only may more solid food be given, but you should order it. Every organ must be exercised according to its development and power, and hence you would not only weaken the stomach by withholding proper stimulus to exertion, but also the consistency and health of the very teeth would be affected; for it is an established fact, that the teeth will more often remain normal with solid and dry, than with liquid, soft, and boiled food. Vegetable food, especially, requires protracted mastication and a large amount of saliva. Those animals known by the name of ruminants spend the largest part of their life in mastication. Mastication and saliva have not so much influence upon animal food; carnivorous animals will not masticate their food slowly, but they tear it in pieces and swallow it at once, leaving all the work of digestion to the stomach, and the other digestive organs of the abdominal cavity. Thus, even children without teeth, and without the full development of their salivary glands, will digest animal food, especially extracts, soups, &c., if administered to them. For this very reason, be cautious in directing the nutrition of small children: such as have no teeth, or bad teeth, or toothache, ought to be kept on a very small amount of amylaceous food, if any; whereas animal food, which requires less saliva and less mastication, is better taken and more readily digested. As it is certain that the first years of life will usually decide as to the future condition of the digestive organs, you perceive the necessity of being unusually careful at this period. You will generally find that little attention is paid to the temporary teeth. Parents and physicians do not care much about them, because they are to fall out and be replaced by the permanent teeth. But when you consider that the permanent teeth will not appear before the seventh or eighth year of life, you perceive what injury can and will be done if the milk-teeth are neglected. Their original condition does not generally depend on the attention of the physician; for they are formed during fœtal life, and their nature is determined sometimes by hereditary influences. Healthy and robust parents, endowed with good constitutions and normal development of their osseous systems ; a mother who has been well during pregnancy, and not suffered from any morbid predisposition ; wholesome and appropriate food ; a well-ventilated residence ;—these are the conditions which influence the proper development of the teeth of the infant.

Great care should be exercised in feeding. Every adult will remove such remnants of food as are retained in the mouth after meals, by either cleansing the mouth with water, or the tongue, &c. Not so with children. Whatever they have not swallowed will be retained in their mouths, adhering to their tongues, cheeks, fauces, or in the folds of the maxillæ ; even the food which has been swallowed will be ejected, owing to the extreme readiness of vomiting observed in a large number of infants. These particles of food, farina, arrowroot, milk, &c., are very liable, by the influence of the air passing the mouth, or with every respiration, to become sour, and then, by their acidity, to affect the crowns of the teeth. Again, you are aware that mothers and nurses, not among the poorer class of the population only, will, whenever a child is crying, either surfeit it with food, and thereby produce vomiting, or gastric catarrh with a superabundance of acid in the gastric secretion and the contents of the stomach, or, what is equally reprehensible, put in its mouth a mass composed of cracker or bread, with water or milk, and sugar. Now, nothing has a greater tendency to become acid than sugar : even in the intestinal canal, the transformation of sugar into lactic acid is a common and normal occurrence. It is not strange, then, that under the influence of ever-changing air in respiration, and the renewed afflux of oxygen, the transformation of the sugar into acid should take place very rapidly. You know from what has been said, that the crowns of the teeth are very easily influenced and destroyed by any slight acid brought into contact with them, even by fruit of any description : you will, therefore, not be surprised to find that the teeth will be severely affected by the transformation of the sugar contained in these filthy compounds. Children of from two to three years of age come under your observation daily in whom this bad custom, and nothing else, has been the cause of the decay of the milk-teeth ; thus giving rise to disturbances of the general health and toothache in early life. To discontinue their use is absolutely necessary before the eruption of the first incisors, as it will be very difficult to do so afterwards. The reason of this is well explained by Spielberger, who emphatically denounces the bad practice alluded to. After the enamel is removed from the crown of the tooth, from the constant effect of the reproduced acid, and the exposed situation of the crown, the access of cold air, and the contact with other warm or cold beverages, will produce intense pain. Even the sucking-bag itself will give rise to pain by becoming cold, and the child will cry until a new and warm one is supplied by the nurse, whose pity is excelled by nothing but her ignorance. She will remove the cold one, and dip it into a warm solution of sugar, or keep it in her own mouth, and again put it into the infant's mouth; and the child will now keep quiet, sucking and sleeping; and it will also allow the nurse to sleep. You will meet with infants, sometimes, who are perfectly incapable of sleeping without this substance between their lips, from the mere fact that the enamel of their teeth is removed, and the ivory half gone, and the infant feels pain from having no protection against the cooling influence of the air. Thus the teeth are destroyed until the pulp, too, is affected, when the child will feel no longer any pain. It has no pain, and no teeth. A tooth will sometimes be eaten away in this manner before the crown is fully developed. You will meet with a large number of children who, from one or more of the reasons alluded to, have no healthy incisors, or perhaps no incisors at all, from their second or third year, up to their seventh or eighth.

As the incisor teeth have no other office but to rend or cut the food, digestion itself will sometimes not suffer much, provided the child masticates well otherwise, mixes the food with a sufficient quantity of saliva, and has a perfect and undisturbed gastric and intestinal digestion, on the condition that the knife, before the food is brought over the lips, does the work of the incisor teeth, as much as artificial means can do. But a serious consequence, alluded to by a number physiologists, and lately by the above-mentioned author, must not be overlooked. You know that a number of letters, as D, T, and even S, C, St, &c., are formed by the tongue approaching the top of the incisors. But what if they are absent? The child will try to pronounce as well as circumstances permit: thus those consonants are formed by the tongue touching the alveolar margin of the jaw-bone, and pronunciation becomes unclear, thick, and lisping. This misfortune is not at all mended by the temporary teeth being replaced by the permanent ones, about the age of seven or eight years; for the child has been accustomed to bring forwards its tongue in pronouncing the consonants D, T, S, C, &c., to the alveolar process, and scarcely ever will this custom be replaced by the better one of again accustoming the tongue to touch the top of the incisor teeth. No muscles are more obstinate, when once used to one particular action and motion, than those of the tongue. This is seen in the attempt to pronounce a foreign language. There are few men who are able to pronounce certain words of a foreign language as well as those of their vernacular; and it is a fact that, from mere physical reasons, a young person will learn the pronunciation of a foreign language more easily than adults, whose lingual muscles have been active for decennia in the same manner and direction, and with the same exertion. Thus there are, therefore, reasons for carefully preserving the milk-teeth in young children, other than merely for the sake of beauty, or digestion, or comfort. If they are destroyed, if toothache is produced, or other inconveniences result, you will naturally think of extraction of such tooth. In my second lecture I alluded to the fact, that after the extraction of a tooth, the jaw-bone becomes atrophied—the alveolar margins narrower, thinner, and lower, and that in the extraction of a temporary tooth this danger is greatest; for, at a later period of life, the permanent one will not meet with sufficient space. Moreover, the molar teeth, at the age of four or five years, have long and deep roots, whereby extraction is rendered very painful. It must be borne in mind, also, that the pulp of the permanent tooth is, about this time, imbedded between the roots of the temporary one, and you may, by forcibly extracting the one, deprive the child of the other at the same time. Again, a hard cicatrix will be formed by extraction, and the permanent tooth may cut through it with difficulty. The child has also suffered a severe loss, being deprived of one of its instruments for mastication. If you can preserve the tooth, it is your duty to do so; while in cases of carious molar teeth in children, it is better to have them filled than extracted. My remarks refer to the normal condition of the teeth and gums. But the tooth must be removed in cases of dental caries, where an inflammation of the inner alveolar membrane, and sometimes suppuration, takes place—a morbid process which is, in a number of cases, complicated with swelling of the submaxillary glands. These tumours are commonly considered scrofulous; but when they are the only symptoms of scrofula which you can detect in a child, never forget to examine the state of the jaw and the teeth, and search carefully for a deep-seated, painful inflammation and suppuration around the root of a tooth.

PROCEEDINGS OF DENTAL SOCIETIES.

COLLEGE OF DENTISTS OF ENGLAND.

DR RICHARDSON'S LECTURES ON THE SALIVARY GLANDS AND SALIVA.

Dr Richardson delivered the second of his course of lectures on the "Salivary Glands and Saliva" at the above institution on Tuesday evening, the 28th May.

In this lecture he first gave the full anatomical relations of the salivary glands, tracing by means of preparations and specimens the sources of blood and nerve supply to each gland. After showing the structure of all the glands to be identical, Dr Richardson treated on their secretion, "saliva;"—the quantity secreted and discharged; the variations in amount under different conditions of the system; the influence of the nervous system on the secretion; the reaction of saliva; the minimum and maximum alkalinity; the physical characters of the fluid; its composition; and lastly, the *uses* of this secretion. Under these various heads a large amount of interesting matter was carefully brought forward, the uses of the saliva being probably the topic most elaborately discussed. In this description the Lecturer accepted as proved the view that the saliva possesses a chemical as well as a mechanical action, and that the chemical use is to act on the amylaceous food compounds after the manner of a true ferment. He stated at the same time that he was not himself satisfied as to the special constituent of the saliva which produced this effect, nor as to the special gland which secreted the secretion having the active constituent for exciting fermentation. The parotid gland and the submaxillary might be excluded from this function, their secretions being evidently for mechanical purposes alone; so that the ferment was a product either of the sublingual or buccal glands, or both.

On Tuesday evening, the 11th ult., Dr Richardson delivered his third and concluding lecture "On the Salivary Glands and Saliva."

This lecture treated on the diseases of the salivary system, which Dr Richardson divided into three great classes: 1. Diseased Conditions of the Glands themselves; 2. Diseased Conditions of the Saliva secreted; and, 4. The Results of Diseased Conditions of Saliva. Each of these heads admitted of subdivision: the first, into diseases of structure, and diseases of the secreting surface of the gland; the second, into saliva charged with morbid poison, saliva surcharged with salts, saliva containing free acid, and saliva containing sugar, bile, &c. The third head was subdivided into "results of rabid saliva, results of supersaline saliva, and results of acid saliva." Out of these various heads, all of which were at once elaborately and lucidly considered, Dr Richardson selected some for special consideration, they being more closely allied to Dental Surgery. Amongst these were, "Salivary Calculus," and "Acid Saliva and its Effects." On the former subject, he remarked, that we are still quite at a loss to know "why special salts should be thrown out by the saliva;" that the phosphates seem to be thrown out in greater abundance in patients with the gouty and phosphatic diathesis; and that there can be no doubt whatever that the glandular systems are the outlets from which these specific secretions are poured. With reference to acid saliva and its effects, after naming the several acids which have been enumerated by several authors as having been detected in the saliva, he observed that our indefinite knowledge as to what acids are generated in this fluid is not surprising, since it is so difficult to procure acid saliva in any quantity sufficient for analytical purposes. He showed that acid saliva occurred mostly in persons with rheumatic affections, and in patients affected with gastritis or dyspepsia; that children with aphthous gums are always subject to this acidity; and he thought it most probable that an acid is the cause of "cancrum oris." In speaking of the effects of acid saliva, he said they were two-fold: a corrosive effect, producing a chemical action on the teeth, leading to caries; and an effect on the soft parts, leading to ulceration. Respecting the frequency of caries from acid saliva, he did not think that was very great; for although under the action of an acid there is no doubt teeth are subject to chemical dissolution of structure, yet acid saliva is not so common a cause of caries in these organs as is generally supposed, inasmuch as the cases are rare in which the saliva loses its alkaline protective power, and assumes the acid reaction.

The lecture, replete with interest, was terminated with a brief glance at the treatment of the various diseases which had been considered; and a cordial vote of thanks was unanimously accorded to the Lecturer for his most able and interesting course.

At a Special Meeting of the Board of Examiners, held on Friday, June 14, Mr John Sherrard Smart, of Park street, Bristol, was admitted a Member of the College by Examination.

NATIONAL DENTAL HOSPITAL.

A MEETING was held on Tuesday, the 4th ult., at the College of Dentists, Cavendish square, for the purpose of forming a "National Dental Hospital."

JOHN BRADY, Esq., M.D., M.P., was announced to take the chair; but in consequence of a very important Irish measure coming on in the House, he was unable to attend, and, at the request of several gentlemen, Dr RICHARDSON presided. There were also present George Waite, Esq., M.R.C.S.; James Robinson, Esq., D.D.S.; H. T. Kempton, Esq., F.L.S.; R. T. Hulme, Esq., M.R.C.S.; Wm. Wood, Esq.; Samuel Lee Rymer, Esq.; — Betts, Esq.; James Merryweather, Esq., M.R.C.S.; J. Cox Smith, Esq. (Maidstone); W. Perkins, Esq.; S. L. Fenzi, Esq.; Haslar Harris, Esq.; A. Sayles, Esq. (Lincoln); T. C. Vidler, Esq.; J. S. Turner, Esq.; A. Hockley, Esq.; S. A. Hayman, Esq. (Bristol); and other members of the Dental Profession.

Letters heartily approving the object of the Meeting, and regretting inability to attend, were read from Dr A. Carpenter; Messrs Neep (Norwich), Smale, Horne (Glasgow), Kelly (Manchester), Bellaby (Nottingham), Moseley (Hull), J. Mathews, Harnett, Little (Bristol), Norman King (Exeter), Coneley, Morrison (Edinburgh), S. R. Thoms, &c. &c.

The CHAIRMAN, in opening the Meeting, said it had been originally intended that Dr Brady should have taken the chair on that occasion; but at the last minute—in fact, at the hour appointed for the commencement of the proceedings—a note had been received from that gentleman stating that he would be unable to attend in consequence of a measure of great importance to him as an Irish member having come on in the House. He (the Chairman) much regretted Dr Brady's absence, but trusted that before they separated he would be able to attend, and in the mean time, to avoid delay, he had taken his place. He proceeded to say that the Hospital they proposed to establish was to be entirely for the relief of those poor persons who could not afford to pay the Dentist's fee when suffering from dental diseases. It had been said that there was already one Dental Hospital; but he must say that although there was not the slightest wish on the part of the founders to in any way disparage or discourage the Hospital already established —(Hear, hear)—still he thought it must be patent that in such a large place as London there was ample room for another. (Hear, hear.) The Hospital would not be merely metropolitan, but national—one for the benefit of the whole of the United Kingdom, and one which expected to receive patients and subscriptions from all parts of the country. The scope of the Hospital was intended to be as liberal as it could possibly be made, and those who had proved themselves Dentists, no matter in what particular class, would be competent to be elected officers. Eight years ago Dentistry of itself was reckoned merely a profession; but through the exertions of a few gentlemen a great change had taken place, and it now stood forward as one of the great sciences. In this country the poor formed the principal source from which instruction was deduced, and that was their way of paying for professional attendance. After observing that the students in the College would have the advantage of experienced men to teach them, and launch them into the world thoroughly practical Dentists, he concluded by moving "That an institution to be called 'The National Dental Hospital' be now established. The Hospital to provide gratuitous and efficient aid to the poor in diseases of the teeth, and to include means for instruction to students preparing for Dental practice as members of the College of Dentists."

Mr **Hayman**, of Bristol, seconded the resolution, and said it appeared to him that there was a great necessity for such an institution, without which students could not expect to become proficient in their studies, especially those who came from the country. He hoped that the scheme would receive a large amount of support.

The resolution was then put, and carried unanimously.

Mr T. C. **Vidler**, the Hon. Secretary, then read the rules as proposed to be adopted.

Mr **Waite**, President of the College of Dentists, moved, and Mr **Wood** seconded, the adoption of the rules, which was agreed to.

The **Chairman** said he had been requested by the Provisional Committee to state that the subscriptions already received amounted to nearly 150*l.*: this sum had been raised without any public appeal; a fact which he thought spoke highly for the supporters of the institution. (Cheers.)

Mr **James Robinson**, in submitting the name of Mr Merryweather as Treasurer, observed that he had known that gentleman for many years, and highly esteemed him. He had therefore much pleasure in proposing him to fill that office, feeling convinced that he would be of essential service to the Hospital, and would do all he could to promote its interests amongst his large and influential connection. (Applause.)

Mr **Betts** seconded the motion, which was cordially agreed to.

Mr **Merryweather**, in returning thanks, said that he undertook the office they had done him the honour of conferring upon him with a great deal of pleasure, as he wished the Hospital every possible success. He hoped to see both the Hospitals united at no very distant period. In the mean time he would do all in his power to advance the interests of the National Dental Hospital. (Loud cheers.)

The resolution was then put, and carried amidst loud applause.

Mr **Wood** moved, Mr **Rymer** seconded, and it was unanimously carried, that the Committee should consist of the following gentlemen—viz , Dr Richardson, Messrs Waite, Brenneis, Robinson, Merryweather, Hockley, Kempton, Thoms, Williams, Hulme, Cox, Smith (Maidstone), Hayman (Bristol), Wood (Brighton), Perkins, Herslet, and Vidler.

The **Chairman** said that they would notice that the President and Vice-Presidents were not mentioned in the list of names submitted to them. The fact was, there were so many gentlemen willing to undertake the office, that it was impossible at present to decide; but it would be settled at some future meeting.

Mr **James Robinson** proposed, and Mr **Brenneis** seconded, that Dr Pavy, of Guy's Hospital, and Dr Richardson be elected as Consulting Physicians; and that Professor Erichsen and Mr Spencer Wells be elected Consulting Surgeons.

The **Chairman**, in putting the resolution, said that for his part he would do all in his power to promote the interests of the Hospital—(cheers)—and for his three colleagues he could safely say, that at whatever hour either of night or day they might be called upon, they would always be found ready. (Hear, hear.)

The motion was carried *nem con*.

Mr **Hulme** moved that Messrs Waite, Merryweather, and Robinson be appointed Consulting Surgeons. He observed that all those gentlemen were so well known, that it was quite unnecessary for him to make any remarks.

Mr **Williams** seconded, and Mr **Hayman** supported the motion, which was cordially agreed to.

Mr **Rymer** moved, and Mr **Williams** seconded, that the following gentlemen be elected Acting Dentists—viz., Messrs Brenneis, Haslar Harris, Hockley, Hulme, Kempton, and Perkins. He proposed that two of the gentlemen should hold that office on account of their being lecturers at the schools.

Mr **Robinson** proposed that the Hospital should be inaugurated by a public dinner, to be held at the Freemasons' Tavern. He begged to move that the dinner be held in July next.

Mr **H. T. Kempton** seconded the resolution, which was agreed to.

Mr **Waite**, in moving a vote of thanks to the Chairman, highly eulogised him for the very able way in which he had discharged his duties, and said he was sure they would all admit he had ably sustained that post in the absence of Dr Brady. (Hear, hear.)

Mr **Wood** seconded the motion, which was carried amidst prolonged cheering.

Dr **Richardson** having briefly returned thanks, the proceedings terminated.

QUARTERLY DENTAL RETROSPECT.

APRIL TO JULY, 1861.

I.—*Case of successful Treatment of Ranula by Electricity.*—By Dr Scarenzid ('Omodei Annali Universali de Medicina,' vol. clxxiv., p. 85). ('Med. Chir. Review,' April 1861.)

A woman, aged sixty-five, applied at the Mantua Hospital, on account of a ranula situated on the right side of the frænum, and which having during three months attained the size of a walnut, caused an obstruction both to speech and mastication. There was some swelling of the submaxillary gland of that side, but this had diminished with the enlargement of the tumour of the mouth. The affection being uncomplicated, it was determined to resort to electricity in its treatment. Two pairs of Bunsen's pile were employed, and a steel needle attached to the negative pole was passed about four centimetres into the fluctuating tumour, the other extremity of the pole being brought into contact with the outer surface of the lower jaw. The current was allowed to act for almost a quarter of an hour, the patient only complaining of a slight smarting. At the seat of puncture, an eschar, a centimetre in size, was formed; and on removal of the needle a portion of the fluid was discharged, the whole afterwards flowing out during the movement of the mouth. Next day strong local reaction was set up, accompanied by considerable fever, which yielded to bleeding and purgatives. In a few days the eschar came away, and the granulating wound healed, without any further collection of fluid having taken place in the cyst, which contracted upon itself. The function of the orifice of the Whartonian duct was recovered, saliva being seen issuing therefrom. The woman was seen on other account more than fifteen months after the operation, and the cure was found to have held perfectly good.

II.—*Fibrous Tumour of the Antrum successfully Removed.*—Mr Paget. ('Lancet,' March 30th, 1861.)

The patient was a young man, eighteen years of age, who had had a swelling of the left side of his face slowly increasing for several years. This swelling was found to originate in a tumour growing within the antrum, projecting forwards below the malar bone, above the alveolus, and upwards into the orbit, displacing the eyeball to a very slight extent. There was some pulsation over that part of the tumour not covered by bone. The nose and mouth were not in any way encroached upon.

The patient was brought into the operating theatre on the 19th of January, when Mr Paget took the opportunity of saying, whilst chloroform was being administered, that the way in which the tumour projected itself fully supported the view of its growth from the cavity of the antrum rather than from the bone. In relation to the pulsation of the tumour in the orbit, although very slight, it was distinct, and was synchronous with the radial pulse. Mr Paget remarked that it was a symptom of malignant disease, but in the present instance it was the only one. The hitherto good health of the patient, the slow growth of the disease, and the non-implication of the bone precluded the idea of malignancy. He further observed that he would endeavour to remove the tumour from the mouth without cutting the cheek; and should this be impracticable, he would try at least to save the alveolus and palate. An incision was now made above the alveolus, the cheek was separated from the tumour for a little way, and the antrum opened by means of a

Hey's saw. After some considerable effort, it was found impossible to excise the growth. An incision was therefore made from the left angle of the lip on to the cheek, the flap reflected, and with the aid of a pair of forceps the opening into the antrum enlarged by removing a part of its anterior wall. The tumour was thus readily got away. It had extended backwards and upwards, had absorbed the floor of the orbit, and reached its posterior angle. It consisted of two large masses, which were wholly removed. The jaw was otherwise left intact. The nature of the tumour was fibrous, and resembled the albuminous sarcoma from its milk-white appearance. No juice was observed on scraping its surface. The patient progressed favourably, and is now well, the wound having entirely healed.

III.—*Necrosis of the Ascending Ramus of the Lower Jaw in a Boy; successful Removal.*—Mr Erichsen. ('Lancet,' April 6th, 1861.)

Necrosis of the jaws is a disease not commonly witnessed in the young, except as the result of some form of injury, of struma, or from the effects of the fumes of phosphorus. A case, however, presented itself, in which neither of these could be stated to be the direct cause of the disease, as it followed the simple extraction of a back molar tooth. The patient was a lad between nine and ten years of age, otherwise in good health, in the right side of whose mouth could be distinctly traced a projecting piece of dead bone, near the second molar tooth of the lower jaw. The aperture through which the bone protruded was large, but Mr Erichsen could not say to what extent the bone was affected until he had endeavoured to remove it. The face was quite swollen. When narcotised with chloroform, on the 27th of March, an effort was made to extract the bone; only a few fragments were got away with forceps, yet there seemed to be a large sequestrum remaining. The aperture was therefore enlarged, and by the aid of strong forceps the bone was well laid hold of, and gradually extracted. Its extent seemed astonishing, for it comprised the whole of the right ascending ramus and coronoid process of the lower jaw, with the exception of the condyle. This had been partially jammed into the shell of new bone, and was not easily extracted until the aperture was enlarged, as already stated. The sequestrum involved the entire thickness of the lower jaw, and was situated somewhat to the inner side of the new bone. Mr Erichsen believed that the condyle remained in connection with the case of new bone, and had not lost its vitality. The boy would therefore have good motion in the temporo-maxillary articulation at a later period, and would no doubt make a good recovery.

An interesting point in the treatment of this case was the removal of a sequestrum from the situation it occupied, in the present instance, entirely through the mouth, without making any wound in the cheek, notwithstanding that there was more trouble in thus getting it away. Some surgeons would not have hesitated to perform a sort of partial resection of the jaw in this case.

The following case, recorded by M. Maisonneuve, bears a considerable resemblance to the one which has just been recorded, and would lead one to anticipate that the jaw will be ultimately reproduced.

IV.—*Sub-periosteal Removal of the Right Half of the Lower Jaw, followed by Reproduction of the part lost.*—M. Maisonneuve. ('Comptes Rendus,' April 6th, 1861.)

At the meeting of the Academy of Sciences on April 1st, M. Maisonneuve presented an instance of the reproduction of the right half of the lower jaw, including the condyle with its articular surface. The reproduction, observed M. Maisonneuve, is so perfect that it is impossible to say which half of the jaw it was that had been removed.

The patient, Esmenger Phillipe, aged thirty-five, a sawyer, entered the Hospital of La Pitié for disease of the lower jaw. Six months previously, the man experienced dull, aching pains in the jaw, which had continued to increase up to the time of his entering the hospital. The cheek on the left side was enormously swollen; four fistulous openings on the exterior communicated with the jaw, two were placed near the symphysis of the chin, a third at the angle of the jaw, and the fourth opposite the temporo-maxillary articulation; an extremely fetid pus was discharged from the openings. The general health was suffering greatly, and it was evident that the whole of the right half of the lower jaw was in a state of necrosis. M. Maisonneuve proposed to the patient to remove the jaw, giving him hopes, founded upon the researches of Flourens, that a new bone would be formed. The operation was performed Nov. 18th, 1854.

The patient having been placed under the influence of chloroform, M. Maisonneuve made a vertical incision through the lower lip in the course of the median line of the chin. From the lower extremity of this first incision, a second was extended along the inferior border of the jaw as far as the masseter muscle. The flap included in these incisions comprised not only the soft parts, but also the periosteum, which was already lined with a new layer of osseous matter, which was in the course of formation, and covered the external surface of the sequestrum. The flap was rapidly dissected off, so as to expose the horizontal ramus of the necrosed bone. The sequestrum was then isolated, care being taken to preserve the gums and teeth which were situated in this part uninjured. This stage of the operation was accomplished so successfully, that the whole of the bone, comprising its ascending ramus, with its coronoid process and condyle, was extracted, leaving the teeth attached to the gums. It was curious, observes M. Maisonneuve, to see this row of osteids attached only to the membrane of the gums, and hanging together like the beads of a rosary. When these parts had been removed, the flap was carefully replaced, and retained by several sutures and a suitable bandage.

The reunion of this extensive wound took place rapidly; the teeth remained attached to the gums, and became fixed by the union of the two ossified layers of the periosteum. The union of the lip in the median line was so complete, that it left scarcely any trace of the operation.

The preparation is now in the Dupuytren Museum.

Several years have elapsed since the operation, and the new jaw is so completely re-formed that it is difficult to say on which side the operation was performed. The man is at present in the service of M. Maisonneuve, enjoys good health, and eats well. After two or three years, the teeth fell out one after another.

V.—*Excision of the Superior Maxilla.*—Mr Fergusson. ('Medical Times,' May 25, 1861.)

The patient was a woman, aged thirty-eight. She had for thirteen years had more or less disease about the right upper maxilla, and seven years ago a tumour had been removed from the cheek. This was, Mr Fergusson believed, probably not connected with the jaw. He had first seen her twelve months before. There was then, in addition to the disease of the jaw, a tumour situated over its front aspect, free and moveable. This was an unusual complication, and rendered the case, as Mr Fergusson then believed, one unfavourable for operation, as suggesting malignancy. There was no enlargement of the glands of the neck; but this, he said, was not common even in cases decidedly malignant. She was sent to him with a view to an operation, but he did not recommend it. He expected that the disease would rapidly progress, and that her life would be short. He was, therefore, somewhat surprised to see her again one day lately, presenting no change in general appearance. He was, therefore, induced to consider the operative aspects of the case more carefully. There was some increase in size, and projecting into the mouth through the hard palate was a soft, elastic, rounded mass. It had also ulcerated, and there was a sloughy, ulcerated condition of the palate round it. He was able to squeeze his fingers into the antrum, or, at least, into a space above the palate. She could blow through both nostrils, and thus it was seen that these parts were free. As he found that the disease had made such slow progress, and that her constitution continued good, he determined, as it was a question of life or death, to attempt the removal of the disease.

In reference to the operation, Mr Fergusson said that he had many debates as to the best method of proceeding. He was not able to adopt in this case, on account of the great extent of the disease, his favourite incisions. His usual plan was to make an incision in the centre of the lip, and then to carry it into the nostril on the side affected, and dissect up the lip and ala nasi in one piece; or if more room were required, to carry the incision on the outside of the nose, and then dissect up the lip and cheek. In the present instance, however, the incision required to be more extensive, as he had to remove most of the upper jaw, and also part of the soft palate: therefore, in addition to those above mentioned, Mr Fergusson carried an incision outwards about a quarter of an inch below the orbit. This plan was, he said, much to be preferred to the method often practised of carrying an incision outwards and upwards from the angle of the mouth. On reflecting the cheek, the superficial tumour was exposed and squeezed out of its capsule. It was, as predicted, quite free. The bone was chiefly removed by the bone-pliers and cutting forceps. Mr Fergusson, however, first by the saw weakened the attachment of the superior maxilla to the malar bone, and applied it also to the alveolar border of the bone near the middle line. Having done this, he broke away the alveolar ridge and removed it, and then, piece by piece, removed the whole of the bone, except the orbital plate, and that forming the upper part of the antrum. On subsequent microscopical examination, it was found that the tumour was not malignant.

In the above case the patient was kept fully under the influence of chloroform by Dr Sansom, by means of chloroform inhaled through the nostril. This was first done in London by Dr Richardson, in a case where Mr Spencer Wells removed half the lower jaw. Dr Sansom's method is a modification of that adopted by M. Faure, and described by him in 'L'Union Médicale' for 1860. He employed it in all cases in which chloroform was to be given, and designed that the mouth should be closed, so that one nostril should receive the tube conveying chloroform vapour, and the other should remain patent to the external air. By these means he felt assured that due dilution of the chloroform vapour in the lungs would be attained. Dr Sansom adopts a somewhat modified method only for prolonging anæsthesia in cases of operation in which the ordinary means for the exhibition of chloroform interferes with the manipulation of the operator, in operations on the mouth, &c. The apparatus is simple. A glass reservoir, capacity two ounces, is connected at its upper part with two tubes; one of glass, very short, of nearly half an inch in diameter, and terminating in a funnel-shaped extremity open to the air; the other a flexible tube, of one quarter of an inch in diameter, and about eighteen inches in length, with an extremity adapted to the patient's nostril. The patient is first brought under the influence of chloroform in the usual way. When the operator commences the manipulation upon the mouth, a drachm of chloroform is poured into the glass reservoir through the funnel-shaped extremity of the glass tube; the reservoir is then shaken so as to project the chloroform against the sides, and thus favour the evaporation. The flexible tube is then pushed up one of the nostrils of the patient, so far as it will penetrate with gentle force. The patient now breathes by one nostril air impregnated with chloroform vapour, by its passing over the evaporating surface in the reservoir, and by the other nostril and by the mouth pure atmospheric air. The free nostril is used as a valve to be closed or left open according as the patient requires more or less of the anæsthetic. The mouth remaining open, there is quite sufficient dilution with air ensured, although the free nostril be completely closed. The flexible tube admits of the apparatus being moved anywhere out of the operator's way. In the present instance the patient was kept well under the influence of chloroform, the administration not interfering at all with the operation.

VI.—*Phosphorus Necrosis.* ('Medical Times and Gazette,' June 8th, 1861.)

At the meeting of the Medical Congress at Zurich, Professor Billroth drew attention to several cases of phosphorus necrosis—a disease which, he stated, was increasing in Zurich in proportion to the development of the lucifer-match manufactory. During the last year no less than eleven cases had come under treatment, of which six were still in the hospital; while in former years generally only four or five of them occurred annually. In seven of the eleven cases just mentioned, more or less extensive resections had to be performed, of which two ended fatally. In one of them death took place in consequence of tuberculosis of the lungs, after the total resection of the jaw was nearly healed; in the other by erysipelas traumaticum, which at a certain time of the year occurred somewhat frequently in the hospital. Of the eleven cases, nine were necrosis of the lower, and two of the upper jaw. A considerable disfigurement of the face is the inevitable consequence of the long suppuration and new formation of bone tissue; and it also remains after operations which have been most successful in other respects. The opinion advanced about twenty years ago by Professor Jüngken, of Berlin, that phosphorus necrosis was not the consequence of the specific effect of phosphorous vapours, but had its origin in the cachetic condition of the men employed in manufacturing lucifer-matches, who were exposed to rheumatic influences, must be totally disregarded. The reason why phosphorus should act with preference upon the periosteum of the jaws, is, up to the present time, just as inexplicable as that mercury should have a special effect upon the mucous membrane of the mouth, calomel upon the liver, iodine upon the glands, strychnia upon the spinal cord, &c.; but the fact cannot be denied. In obstinate toothache, caries of the teeth, even in periostitis and caries of the jaw, the symptoms and results are quite different from those observed in phosphorus necrosis. This latter comes on only in consequence of a long-continued inhalation of phosphorous vapours, either as gas or as phosphorous acid. It is not unfrequently observed in persons with originally remarkably handsome and healthy teeth; in some it comes on after they have resided or been employed in the factories for a year only; in others, after five, ten, or even more years. The first symptoms of the disease are the falling out of single teeth, toothache and swelling of the jaws, which does not decrease, but continually augments. Fistulæ of the teeth are then formed; abscesses, which break either into the mouth or outwards; while at the same time the swelling of one-half or one-third of the lower jaw becomes more considerable and harder. Besides, a cachectic condition of the system generally is observed in an early stage of the disease. This is shown by pallor of the çomplexion, weakness, loss of appetite, acid eructations, &c. The exhaled air and the cavity of the mouth have a strong smell of phosphorous acid; and a patient who has been under the care of Professor Billroth, while at Berlin, assured him that he had often seen phosphorous, luminous appearances proceed from his mouth. This is observed even after the patients have discontinued living or working in the factories for some time. The suppuration, the formation of fistulæ, the development of new layers of bone tissue, almost always continue for months or even years; the deglutition of pus and the deficient mastication of the food render the condition of the patients worse and worse. Professor Billroth has in several instances tried an abortive treatment of the periostitis, before necrosis of the jaws had set in; but up to the present time his efforts in this direction have been unsuccessful. Deep incisions, even down to the bone, made at an early period of the distemper, in order to prevent the accumulation of pus, and to stop, if possible, by the inflammation and granulation consequent upon such operative proceedings, the process of destruction, have hitherto never led to the desired result. In cases when the patients come to the Hospital at an early period, Professor Billroth is therefore now trying the effect of a thorough mercurial and iodine treatment of the disease.

The course of the disease is usually a most melancholy one. Every few months a new attack of periostitis sets in, the demarcation proceeds further, parts which were healthy before are deadened, and even newly-formed layers of bone tissue are again destroyed. The cure—or rather the stoppage of the morbid process, if the patient do not die before by consumption—follows only after years of suffering, in consequence of entire destruction and elimination of one-third, one-half, or even three-quarters of the lower jaw. The disease is much less frequent in the upper jaw; but if this be attacked, the destruction is generally even more extensive. A partial or total resection of the mandibula shortens, at least, the course of the disease, which would otherwise last for years; and although extensive disfigurements remain after such an operation, it ought not to be rejected on that account, as it is the only means we have of saving the life of the patient. In operating, Professor Billroth penetrates immediately, with one incision, which he makes parallel to the necrotic part, through the skin down to the bone; he then scrapes off the periosteum with its bony layers upwards and downwards, by means of a raspatorium, and saws smaller or larger pieces of bone out of the jaw; or he nips those pieces off by means of bone-pincers. In a few cases it appeared advisable to disarticulate at once one or both coronoid and condyloid processes of the lower jaw, which was very easily done, as the joint had become very loose in consequence of the long suppuration. Of the six cases shown by the Professor, two were healed, and amongst them was one of total resection of the jaw in a woman of thirty-five years. This case was in so far remarkable, as two apparently healthy teeth had remained in the periosteum, which had become partly ossified, and in the gums, which had remained healthy; and these have now been used for seven months. Mastication is not impaired, and the woman has a much healthier appearance. The second case in which the resection of one-half of the jaw was performed, is also well healed; but the mouth is, of course, crooked. Two cases in which a partial resection has been made, are progressing favourably; in another case the treatment with mercury and iodine has been commenced. Professor Billroth requested the Doctors present at his demonstrations, and especially the Medical Officers of Health, to do all in their power to prevent the further recurrence of this disease, by ordering better sanitary measures to be taken in the factories than those in use at present.

VII.—*Inflammation of the Parotid Salivary Gland.*—Mr Wormald.
('Medical Times and Gazette,' May 18, 1861.)

A man, aged twenty-four, admitted a few days ago for inflammation of the parotid salivary gland. There was a swelling mapping out the position of the parotid and the socia parotidis. He had had great pain for a month, and had been obliged to take opiates regularly. The treatment Mr Wormald adopted was to puncture the swelling in many places deeply with a scalpel. There was no suppuration, but this treatment at once relieved the pain, and the man was able to dispense with opiates.

The following statistical returns of operations, during the year 1860, for removal of tumours of the upper jaw, and for epithileal cancer of the lips and tongue, have been published in the 'Medical Times and Gazette.' These returns have been collected by J. Hughlings Jackson, M.D., and refer to the Derby, Leeds, Leicester, Sussex county, Addenbrooke's (Cambridge), Nottingham, Cheshire, Cheltenham, West Norfolk and Lynn, Sheffield, Hull, Northampton, Cumberland, and Gloucester Hospitals.

Operations for Tumours of the Upper Jaw. ('Medical Times,' June 15th, 1861.)

Case 1.—Addenbrooke's Hospital (Cambridge): Dr Humphry.—A man, aged twenty-four. Encephaloid tumour of the upper jaw. Dr Humphry removed the upper jaw. He made an incision through the lip in the median line, and another from the angle of the mouth. Recovered. *Case* 2.—The Liverpool Royal Infirmary: Mr Bickersteth. —A lad, aged nineteen. Malignant disease of the right upper jaw, of ten months' duration. The operation was followed by very considerable hæmorrhage. Erysipelas set in on the fourth day after the operation, and spread to the fauces. Death ensued on the fourth day. *Case* 3.—The Chester Infirmary: Mr Essex Bowen.—A healthy married woman, aged thirty-six, with four children. An irregular solid tumour of the right upper maxilla, projecting and well defined at its posterior limit, between the first and second molar teeth, and encroaching unevenly upon the roof of the mouth. It has been of slow growth, painless, and of firm consistence. Its anterior limit was between the canine and first bicuspid teeth. The first bicuspid and first molar were extracted, and the soft parts having been dissected up from the bone, that portion of the maxilla giving attachment to the growth was completely removed by aid of bone-scissors. Chloroform was commenced with, but it was subsequently found impracticable to persist in its administration. The resulting hæmorrhage proved obstinate, and was only suppressed by resort to the actual cautery. She remains free from any sign of a recurrence of the tumour (March, 1861). The appearance of the tumour after removal, as well is its history, point to its being of a benign nature. *Case* 4.—The Chester Infirmary: Mr Essex Bowen.—A boy, aged six. Malignant tumour (epulis). Half-an-inch of the subjacent alveolar process was removed by the bone-nippers. Recovery. There has been no recurrence of the growth (March, 1861). *Case* 5.—The Chester Infirmary: Mr Essex Bowen.—A woman, aged twenty-five. After having suffered, three years ago, from what was described as a large cystic tumour of the left side of the lower maxilla, and which was cured by the extraction of a "row of tooth-stumps," she was now troubled with an enlargement in the upper maxilla of the same side, above the canine tooth, elastic to the touch. The tumour was freely incised, giving exit to a serous fluid, in which a quantity of cholesterine was suspended, and the cavity stuffed with lint. This lead to a perfect cure, and all enlargement has disappeared from the cheek. Chloroform not given.

Operations for Removal of Epithelial Cancer of the Lips and Tongue.
('Medical Times,' June, 1861.)

Epithelial Cancer.—*Case* 1. The Sussex County: Mr Blaker.—A man, aged fifty-seven. Very extensive epithelial cancer of the lower lip. Duration two and a half years. Glands not affected. The wound healed well, the cicatrix being scarcely visible. *Case* 2.—The Sussex County: Mr Blaker.—A man, aged fifty-seven. Epithelial cancer of the lower lip. He was not a smoker. Excision. Recovery. *Case* 3.—The Gloucester General Infirmary.—Mr Wilton.—A man, aged fifty-nine. Epithelial cancer of the lower lip, of fourteen months' duration. Excision. Recovery. *Case* 4.—The Gloucester General Infirmary: Mr Lovegrove.—A man, aged forty-one. Epithelial ulceration of part of the lower and upper lip and angle of the mouth. Duration four years. Excision. When the wound had nearly healed, there appeared at one part of the cicatrix an ulcerated granulating edge. *Case* 5.—The Gloucester General Infirmary: Mr Lovegrove.—A man, aged seventy-one. Epithelial ulceration of the lower lip, of twelve months' duration. Nearly the whole of the lower lip was removed, and the wounded surface healed. *Case* 6.—The York County Hospital: Mr Husband.—A man, aged seventy. Cancer of the lip. Excision. Recovery. *Case* 7.—The Derby Infirmary: Mr Johnson.—A man, aged fifty, a smoker. Epithelial cancer involving the whole of the lower lip. Excision. Recovery. *Case* 8.—The Sussex County Hospital: Mr Blaker.—A man, aged forty-two. Epithelial cancer of the lower lip. Excision. Recovery. *Case* 9.—The Leeds General Infirmary: Mr Smith.—A man, aged seventy-five. A large epithelial growth removed from the angle of the mouth. Recovery. *Case* 10.—The Leeds General Infirmary: Mr Hey.—A man, aged sixty-five. A small epithelial cancer of the lower lip. Excision. Recovery. *Case* 11.—The Leeds General Infirmary: Mr Hey.—A man, aged sixty. A small epithelial cancer of the lower lip. Excision. Recovery. *Case* 12.—The Leeds General Infirmary: Mr Teale.—A man, aged forty-seven. Removal of an epithelial growth of the size of a walnut in the lower lip. Recovery. *Case* 13.—The Leeds General Infirmary: Mr Smith.—A man, aged fifty. A large epithelial cancer of the lower lip and cheek. Recovery. *Case* 14.—The Leeds General Infirmary: Mr Teale.—A man, aged fifty-four. Removal of epithelial cancer occupying anterior half of tongue on one side. Glands under the jaw enlarged. Recovery. *Case* 15.—The Leeds General Infirmary.—A man, aged sixty-seven. A small epithelial cancer on the side of the tongue. Recovery. *Case* 16.—The West Norfolk and Lynn Infirmary: Mr Kendall.—A man, aged fifty-three. A great smoker. Epithelial cancer of the lip. Excision. Recovery.

CORRESPONDENCE.

THE 'LANCET' AND THE COLLEGE OF DENTISTS.

The Secretary of the College of Dentists of England presents his compliments to the Editor of the DENTAL REVIEW, and will feel obliged by the insertion, in his next impression, of the accompanying copy of an article which appeared in the 'Lancet' of the 8th inst., and of the reply thereto which appeared in the same journal of the 22nd inst.

5 Cavendish square, June 25th, 1861.

A COLLEGE OF DENTISTS.

"THE knot of gentlemen who lately clubbed together to call themselves the College of Dentists have since proceeded to put themselves in funds by an extensive distribution of diplomas, whence have sprung consequences tending to disgrace the name of College, and to degrade the profession of Dentists. In view of their loud protestations of anxiety for the honour of their profession, and accepting their pretension to perfect independence of action as a possibly conscientious motive for refusing to profit by the Charter granted in their behalf to the College of Surgeons by the Government, we expressed lately the opinion that the Medical Profession would be willing to overlook their past errors and manifold misstatements, and to judge of their earnestness and good bearing by their acts. It is now apparent that they have justified some of the bitterest predictions of their opponents, and stamped themselves with disfavour. The highest but most salutary restraints appear to have been cast off, and the showering of diplomas seems to be carried on with little regard to the interests or honour of the profession. In order that a full judgment might be formed of the laxity which has thus been shown, it would be necessary to collect and quote the numerous puffs which now fill the London and country papers. These advertisements emanate from Dentists, whose habitual trick of inserting trade advertisements, puffing their particular wares, and vaunting their peculiar skill, has not prevented their election, nor has their election into the "College" arrested or modified their course of proceeding. Not only do these persons continue their plan of advertising after election, but they proceed to enhance the attractions of the manifesto by announcing themselves as M.C.D.E., or in full length, Member of the College of Dentists of England. There is only one collegiate institution in London with which we are acquainted that is equally self-constituted, and equally widely advertised for trade purposes: it is the "Morisonian Institute," or "College of Health." It is desirable that no mistake should exist as to the powers and authority of this College of Dentists; for from the moment that it lends its name to advertisers who offer to supply teeth at 2*l*. per set, "and unless the utmost satisfaction is given no fee is required," to others who advertise their "sole patents and inventions," to others who announce that "persons may be attended at their own residences without a fee,"—from the moment that it prostitutes the title of College, which it has assumed, to become the decoration and the bait of such placards, it is false to the purpose which it announced in claiming our suffrages, and it ceases in any sense to represent the honour or the interests of the more respectable part of the Dental Profession. We can heartily sympathise in the protests which these gentlemen have put forth in their recognised organ, the 'British Journal of Dental Science.' It is important for the interests of the Licentiates in Dental Surgery now affiliated to our body, it is important to all who value their social and intellectual status, that they should not be supposed to be represented professionally by a body which can consent to practices so undignified, or allow its name to be paraded as a sanction to proceedings so entirely opposed to the canons of professional conduct."

TO THE EDITOR OF 'THE LANCET.'

Sir,—In the number of the 'Lancet' of the 8th instant, an article appears in the "Medical Annotations" directed against the College of Dentists. The same article appearing in a less influential journal, might have been allowed to pass unnoticed; but as occurring in the 'Lancet,' and as conveying a series of charges which, if uncorrected, might mislead a large class of readers, the Council of the College of Dentists has requested me, as President of the College, to forward to you the following answer. We have striven in this reply to meet every point adduced against us temperately and fairly, in a way as shall become us as men who have been misunderstood and misrepresented, and who, conscious of such misconstruction, would set themselves properly before the public. We feel confident that your sense of justice will grant us the privilege of this defence.

The article to which we refer sets against us two charges:—1st. That we are disposing of certificates from our institution to advertising Dentists, in such way as to enable them, by assuming membership with us, to pass themselves off as something more than usually eminent in their profession. 2nd. That by our proceedings we are not advancing, but, on the contrary, degrading our profession, and this to such an extent as to make our institution the analogue of a notorious charlatanic establishment conducted by a single family for the sale of a patent nostrum which you have designated.

In reply to the first of these charges, we beg unequivocally to state that the reading you have given against us, whoever may have advised you to it, is incorrect, both in principle and in fact. In principle, the position of the College of Dentists is the same as that of every other similar body—*i. e.*, under certain conditions fixed by laws agreed to by the majority, members are admitted to the College, and have certain privileges common to such admissions. They can attend all meetings, vote in election of officers, have the use of the library, and the like. From the first moment when the College was opened, (not opened, be it observed, by "a knot of men who recently clubbed together," as your article says, but by the voice of a large body of Dentists, expressed at a meeting publicly convened nearly five years ago—see the 'Lancet' for Sept. 27th and Nov. 15th, 1856,) laws were specially made for excluding from membership every man who in any way could be considered as guilty of practising his profession in a quackish and dishonourable manner; and these laws, we can state implicitly, have not only been rigidly adhered to, but have, from time to time, been revised and made more stringent. Thus, at the present time, the following conditions are those acted upon in relation to the election of members:—1st. The candidate must transmit a paper declaring he does not advertise, contrary to the rules of the College. 2nd. A paper, signed by four members of the College, or by medical men, that he is a fit person to be admitted. 3rd. He must sign a paper declaring he will adhere to the laws of the College. We admit, nevertheless, that notwithstanding the stringency of these rules, it has happened, in a few instances, that certain persons who have taken up our membership have proceeded in a way this

Council entirely condemns, and the best mode of dealing with these individuals has often been matter for discussion by the Council.

Sir, we are sure that you will admit with us, that various and extreme difficulties beset the question which has thus been brought before us. Unfortunately, on looking for any precedent, we have found none. We compare ourselves, for instance, with the College of Surgeons, and we find that amongst the members of that body there are several of the most systematic advertisers in England. We turn to the few men who have taken the Dental Certificate of the College of Surgeons, and we find even amongst these, who have been arbitrarily and specially selected by the Council, men who continually advertise and issue bills. We see that the College of Surgeons takes no note of these men, and, indeed, it is currently believed that legally it can do nothing. We are not different to the College of Surgeons, but instead of being passive, we have ventured to act. Within this very year, for instance, we have struck off our roll the names of two members, and have refused membership to three others who have applied to us for election, because they were advertising in a manner not permitted by our laws.

On the second charge which your article conveys against us we have to make the following statements:—We are in every particular constituted as many other Colleges—such, for instance, as the College of Preceptors, the Agricultural College, and the College of Civil Engineers. Our members and associates number over 160, are distributed through all parts of England, and have a position, scientific and social, not inferior to others of the profession. In carrying out our principles we have done everything in our power for the establishment of a scientific collegiate body. Thus, we have in the five years of our existence had delivered eleven distinct courses of lectures from men who, by position and practical knowledge, were best fitted for the task. We have inaugurated a school for systematic instruction in dentistry and the collateral sciences for our junior brethren. We have published four yearly volumes of 'Transactions,' which have been largely reprinted and circulated both in this country and in America. We have opened a reading-room, library, and museum. We have appointed committees to investigate special scientific questions. We have instituted liberal prizes for the promotion of Dental Science, and we have provided during the session for monthly discussions and readings. Finally, to give our membership more value, we have lately originated a system of admission of members by examination, the Examining Board having been selected with all the judgment we could bestow upon the selection.

We ask you, Sir, in fairness, could we do more, or work in any better or safer path? Is there in these progressions one single deviation from the strictest scientific orthodoxy and principle? Of our political views we do not speak on this occasion, except to say that that which we profess, we conscientiously believe to be the best for the public, the Profession of Medicine, and the Profession of Dentistry. Nor are we alone in this belief; for when in the beginning of 1860 we appealed to the Medical Profession in England, putting our own position, indeed, in the hands of the Medical body, the large number of 3,000 gave us their suffrages, and bade us go on.

Anxious to these gentlemen, not less than to yourself, Sir, to vindicate our honour and good faith, we submit the above facts to the consideration of your readers.

I have the honour to be,
On behalf of the Council of the College of Dentists,
Your obedient servant,
Old Burlington street, June, 1861. GEORGE WAITE, M.R.C.S.

MISCELLANEOUS.

Termination of Motor Nerves.—M. Kuhne, in a paper addressed to the *Académie des Sciences* on Feb. 18th, states that the terminal divisions of the nerves distributed to the muscles undergo the following changes :—The envelope of the ultimate nerve fibre unites with the sarcolemma of the muscular fibre. The double contour of the nerve formed by its medullary envelope suddenly ceases. The axis cylinder then passes beneath the sarcolemma of the muscular fibre, and is thus brought in contact with the striated contractile material. The axis cylinder then enlarges at certain parts, where it is furnished with small granular bodies, which M. Kuhne terms *peripheral nervous buds.* When the intra-muscular axis cylinder is short, it terminates in a single bud. By the side of these short axis cylinders, others are found, measuring from the ·039 to the ·196 of an English inch : these are furnished with several buds, and generally terminate in a well-defined point, placed between the striæ of the contractile muscular substance. The peripheral nervous buds are placed upon the axis cylinder, of which they form a part : they vary in size from the ·00019 to the ·0039 of an inch ; they are very granular, and generally pointed at their extremities. M. Kuhne has never been able to detect a nucleus, and it is by means of these appendages to the axis of the cylinder that the motor nerve comes in the most intimate contact with the contractile substance of the muscle in which the granulations of the nerve are embedded.—'Archives Générales de Médecine,' April 1861, p. 531.

Vegetable Wax.—This substance has long been known as one of the curiosities of natural history, but for some years has formed an article of commerce. It is obtained from the fruit of the *Rhus succedanea* (Japan wax), or from the berries of the *Myrica cerifica* (American wax), or from other plants. The several varieties differ but little from each other, and may be used indifferently in the manufacture of the various pharmaceutical preparations into the composition of which bees' wax enters. We have prepared a cerate with it, which was everything that could be required as regards colour, adhesiveness, and consistency. The interest which belongs to this new kind of wax arises from its low price, compared with that of the common wax. In this respect it can even compete with stearic acid. Several persons have examined the difference between vegetable wax and that of bees. M. Marchand, of St Germain's found that the sulphuret of carbon dissolved 40 out of 100 parts of animal wax, and 75 out of 100 of the Japan wax. These experiments were made upon the bleached wax. The same solvent, tried upon the varieties of yellow wax, gave the following proportions : 53 out of 100 of bees' wax, and 78 out 100 from the vegetable wax. M. Robineau used for the same purpose rectified ether. The residue obtained with this solvent was more than that from the sulphuret of carbon. Japan wax left 44 parts in 100, and bees' wax 16 in 100. This difference of solubility is of no consequence for pharmaceutical purposes, and the one may be substituted for the other without any agreeable difference in the preparation.—'L'Art Dentaire.'

NOTICES TO READERS AND CORRESPONDENTS.

The continuation of Hunter on the Teeth is unavoidably postponed till next month.

BOOKS RECEIVED IN EXCHANGE.

The Dental Cosmos for June.

The Dental Register of the West for June.

L'Art Dentaire for June.

Mittheiliengen des Central Vereines Deutsches Zahnarzte. Deutsche Vierteljahrsschrift für Zahnheilkunde (Transactions of the Central Society of German Dentists, and German Quarterly Journal of Dental Science, from December, 1859, to April, 1861). Edited by Dr Moriz Heider, assisted by Herr Ad. zur Nedden.

Pharmaceutical Journal for June.

THE

DENTAL REVIEW.

AUGUST, 1861.

THE NATURAL HISTORY OF THE HUMAN TEETH.

By JOHN HUNTER, F.R.S.

EDITED BY

FRANCIS C. WEBB, M.D. Edin., F.L.S., F.S.A.,

Member of the Royal College of Physicians of London; Physician to the Great Northern Hospital, &c.

(Continued from page 246.)

OF THE CAVITY OF THE TEETH.

Every Tooth has an internal Cavity, which extends nearly the whole length of its bony part. It opens, or begins at the point of the fang, where it is small; but in its passage becomes larger, and ends in the body of the Tooth. This end is exactly of the shape of the body of the Tooth to which it belongs. In general it may be said, that the whole of the Cavity is nearly of the shape of the Tooth itself, larger in the body of the Tooth, and thence gradually smaller to the extremity of the fang; simple, where the Tooth has but one root; and in the same manner compounded, when the Tooth has two or more fangs.

This Cavity is not cellular, but smooth in its surface: it contains no marrow, but appears to be filled with blood-vessels, and, I suppose, nerves, united by a pulpy or cellular substance. (*v*)

(*v*) [The dentinal pulp is that portion of the fœtal tooth-papilla which remains after the development of the dentine. It is connected below with the periosteum lining the alveolus, passes up the aperture in the fang, and accurately fills the central cavity of the tooth, being everywhere in close contact with and adherent to the inner surface of the dentine. It is a soft red substance, highly vascular, with the exception of a layer on its surface, and well supplied with nerves. In structure that portion which contains vessels consists, according to Kölliker, of "an indistinctly fibrous connective tissue, with very numerous round or elongated nuclei interspersed." The same authority describes the pulp as being covered by a delicate structureless membrane, under which is seated "a layer 0·02‴, 0·03‴, to 0·04‴ thick, consisting of several rows of cylindrical or

The vessels are branches of the superior and inferior Maxillaries; and the nerves must come from the second and third branches of the fifth pair.

By injections we can trace the blood-vessels distinctly through the whole Cavity of the Tooth; (*w*) but I could never trace the Nerves distinctly even to the beginning of the Cavity. (*x*)

OF THE PERIOSTEUM OF THE TEETH.

The Teeth, as we observed, are covered by an Enamel only at their bodies; but at their fangs they have a Periosteum,

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conical nucleated cells, 0·012‴ long, 0·002‴ to 0·003‴ broad, disposed perpendicularly upon the surface of the pulp like a columnar epithelium. Further inwards, these cells are arranged less regularly, and at length pass into the vascular tissue of the pulp without well-defined limits by the medium of shorter and more roundish cells." (1). These cells correspond with those termed by the same author "the formative cells of the dentine," and he believes that they furnish materials for any deposition of dentine on the walls of the cavity which may occur in the adult.]

(*w*) [From three to ten small arteries may be observed entering the pulp of each tooth. By ramifying in the pulp substance, they produce a loose net-work of capillaries, from which the veins arise. No lymphatics have been observed in the dentinal pulp. (2)]

(*x*) According to Kölliker, the nerve supply to each tooth consists of a principal trunk, 0·03‴ to 0·04‴ in size, and of six or even more fine twigs, 0·01‴ to 0·02‴. These ascend into the pulp cavity without forming at first considerable anastomoses, but giving off separate fibrils. On reaching the thicker part of the pulp, they form a rich plexus "with elongated meshes and collections of nerve tubes, and thus gradually break up into fine primitive fibres, 0·001‴ to 0·0016‴ in diameter." These primitive fibres form evident loops, but it is uncertain whether they represent the absolute terminations. (3). Mr Tomes states that he has been unable to trace any connection between the ultimate nerve fibres of the pulp and the dentinal fibrillæ which he describes. (4)

It would appear that at least in some instances the size of the nerve supplying the tooth-pulp is proportionate to the size and importance of the tooth. Thus Professor Owen notices the large size of the nerve supplying the laniary in the Dog and other *Carnivora*. In the Boar, he observes that the nerve supplying the developed tusk is still larger, having relation not only to the size of the tooth, but also to the continual reproduction of the matrix at its base. (5)]

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(1) Kölliker's Manual of Human Microscopical Anat., pp. 299, 300.

(2) Op. cit., p. 300.

(3) Kölliker, op. cit., p. 300.

(4) Tomes, Manual of Dental Surgery, p. 286.

(5) Odontography, Introduction, p. lxvi.

which, though very thin, is vascular, and appears to be common to the Tooth which it incloses, and the socket, which it lines as an investing internal membrane. (*y*) It covers the Tooth a little beyond the bony socket, and is there attached to the Gum.

OF THE SITUATION OF THE TEETH.

The general shape and situation of the Teeth are obvious. (*z*)

(*y*) [A difference of opinion appears to exist between writers on the subject of the dental periosteum. Hunter, Bichat, and Kölliker describe but one layer of periosteum as common to the tooth and the socket. The latter author writes, "the periosteum of the alveoli is very accurately applied to the surface of the fangs." Other observers, amongst whom are Fox, Bell, Spence Bate, and Hulme, believe that the periosteum consists of two layers—one lining the alveolar cavity, the other covering the fang. Mr Bell asserts that he has been frequently able to demonstrate the existence of two layers in the dead subject. (1) Mr Spence Bate applies the term "peridenteum" to the layer covering the fang, to distinguish it from the periosteum of the alveolus. He regards the peridenteum as a dermal tissue distinct in origin from the periosteum, and on their complete separation, he believes, depends the fact that osseous union is never observed between the tooth-fang and the alveolus. (2) Mr Hulme, in his published Lectures on Diseases of the Dental Periosteum, adduces the case of some herbivorous quadrupeds, as for instance the common Ox, in which the distinction of the layers is easily shown in support of a similar view. The latter author does not allow that the layer covering the fang is merely a reflection of that lining the socket: he believes, with Mr Bate, that there is a distinct origin for each membrane. "The alveolus," he writes, "is provided with its periosteum long before the crown of the tooth is completed; whereas in the tooth there is no periosteal layer until the formation of its fang and its investing layer of cement. At the period when the fang of the tooth is about to be formed, the sac of the tooth-germ becomes adherent to the neck of the tooth; its outermost layer continues to grow in the same ratio as the fang, and becomes the formative organ of the cement. When the tooth is completed, this membrane still remains, and constitutes its periosteum. At the apex of the fully-developed fang, the periosteum of the tooth becomes ultimately associated with that of the alveolus, and the contiguous surfaces of the two membranes are connected together by the passage of blood-vessels and nerves." (3) Kölliker states that the alveolar periosteum is softer than that of other bones, that it contains no elastic elements, but rich plexuses of nerves having thick nerve-tubes. (4)]

(*z*) [In the class Mammalia, true teeth implanted in sockets are

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(1) The Anatomy, Physiology, and Diseases of the Teeth, by T. Bell, F.R.S., p. 43, 2nd edition.

(2) On the Peridental Membrane, in its relation to the Dental Tissues,—British Journal of Dental Science, vol. i., p. 7.

(3) Dental Review, vol. iii., p. 204.

(4) Kölliker, op. cit., loc. cit.

The opposition of those of the two Jaws, and the circle which each row describes, need not be particularly explained, as they may be very well seen in the living body, and may be supposed to be already understood, from what was said of the Alveolar Processes.

We may just observe, with regard to the situation of the two rows, that when they are in the most natural state of contact, the Teeth of the Upper-Jaw project a little beyond the lower Teeth, even at the sides of the Jaws; but still more remarkably at the fore part, where in most people the upper Teeth lie before those of the Lower-Jaw: and at the lateral part of each row, the line, or surface of contact, is hollow from behind forwards, in the Lower-Jaw; and in the same proportion it is convex in the Upper-Jaw.

The edge of each row is single at the fore part of the Jaws; but as the Teeth grow thicker backwards, it there splits into an internal and external edge. The canine Tooth, which we shall call *Cuspidatus*, is the point from which the two edges go off; so that the first grinder, or what we shall call the first *Bicuspis*, is the first Tooth that has a double edge.

OF THE NUMBER OF TEETH.

Their number in the whole, at full maturity, is from twenty-eight to thirty-two: I once saw twenty-seven only, never more than thirty-two. Fourteen of them are placed in each Jaw, when the whole number is no more than twenty-eight; and sixteen, when there are thirty-two. If the whole be twenty-nine or thirty-one in number, the Upper-Jaw sometimes, and sometimes the Lower, has one more than the other; and when the Number is thirty, I find them sometimes divided equally between the two Jaws; and in other subjects sixteen of them are in one Jaw, and fourteen in the other. In speaking of the number of Teeth, I am supposing that none of them have been pulled out, or otherwise lost; but that there are from eight to

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restricted to the maxillary, premaxillary, and inferior maxillary bones. They form a single row in each jaw, and in most Mammals, as in Man, occupy each of the above-mentioned bones. They may, however, project only from the premaxillary bones, as in the Narwhal; or only from the lower maxillary bone, as in *Ziphius;* or be implanted only in the superior and inferior maxillaries, and not in the premaxillaries, as in the true Ruminantia and most Bruta (Sloths, Armadillos, Orycteropes). (1)]

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(1) Owen on the Characters of the Class Mammalia,—Journal Proc. Lin. Soc., vol. ii., p. 6.

twelve of those large posterior Teeth, which I call Grinders, and that they are so close planted as to make a continuity in the circle: and in this case, when the number is less than thirty-two, the deficiency is in the last grinder. (*a*)

The Teeth differ very much in figure from one another; but those on the right side in each Jaw resemble exactly those on the left, so as to be in pairs; and the pairs belonging to the Upper-Jaw nearly resemble the corresponding Teeth of the Lower-Jaw in situation, figure, and use.

Each Tooth is divided into two parts, viz., first, the body, or that part of it which is the thickest, and stands bare beyond the Alveoli and Gums; secondly, the fang, or root, which is lodged within the Gum and Alveolar Process: and the boundary between these two parts, which is grasped by the edge of the Gum, is called the Neck of a Tooth. The bodies of the different Teeth differ very much in shape and size, and so do their roots. The difference must be considered hereafter.

The Teeth of each Jaw are commonly divided into three classes, viz. *Incisors, Canine,* and *Grinders;* but from considering some circumstances of their form, growth and use, I chuse to divide them into the four following classes, viz. *Incisores*, commonly called Fore Teeth; *Cuspidati*, vulgarly called *Canine; Bicuspides*, or the two first Grinders; and *Molares*, or the three last Teeth. The number of each class, in each Jaw,

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(*a*) [The normal number of the permanent teeth in Man is thirty-two. It occasionally happens that the last molars, or wisdom teeth, remain enclosed in their bony recesses until a late period of life. In some few instances they may be absent.

In the class Mammalia, examples of the greatest number of teeth are observed amongst those forms which generate but a single set of teeth (*Monophyodonts*), and occur in the orders Cetacea and Bruta. Thus the priodont Armadillo has ninety-eight teeth; the Cachalot, upwards of sixty, most of them being confined to the lower jaw; the common Porpoise has between eighty and ninety; the Gangetic Dolphin, one hundred and twenty; whilst the true Dolphin presents the maximum number in Mammalia, having from one hundred to one hundred and ninety teeth. Where the teeth are excessive in number, they are of small size, equal or nearly so, and usually conical in form.

In placental Mammalia which have two sets of teeth the one succeeding the other *(Diphyodonts)*, the number of the permanent teeth never exceeds forty-four.

A few genera and species of Mammalia are strictly edentulous. Thus the true Ant-eaters *(Myrmecophaga)*, the scaly Ant-eaters *(Manis)*, and the spiny monotrematous Ant-eaters *(Echidna)* possess no dental apparatus. (1)]

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(1) Owen, op. cit., pp. 5—9.

for the most part, is four *Incisores*, two *Cuspidati*, four *Bicuspides*, and four, five, or six *Molares.* (*b*)

There is a regular gradation, both in growth and form through these classes, from the *Incisores* to the *Molares*, in

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(*b*) [The permanent human dentition is indicated by the subjoined formula:

$$i\,\frac{2-2}{2-2}\qquad c\,\frac{1-1}{1-1}\qquad p\,\frac{2-2}{2-2}\qquad m\,\frac{3-3}{3-3}=32$$

The following is the definition and classification of teeth in diphyodont Mammalia proposed by Professor Owen. The permanent teeth in diphyodont Mammalia are referrible to four classes—viz., incisors, canines, premolars (called in Man bicuspides), and molars. The terms 'incisor,' 'canine,' and 'molar' had originally reference to the shape and office of the teeth: they are now, however, used in Comparative Anatomy to distinguish teeth according to their relative position, connections, and development; the latter circumstances constituting a truer guide to the homologies of organs than shape, size, or office. The incisors are those teeth which are implanted in the premaxillary bones and in the corresponding part of the lower jaw. Thus the term incisor comes to include the tusk of the Elephant, the pectinated lower front teeth of the Flying Lemur, the broad tuberculate front teeth of some Carnivora. The tooth in the superior maxillary bone which is situated at or near to the suture between it and the premaxillary, is the upper canine; the lower canine is that tooth which, in opposing the upper, passes in front of its crown when the mouth is closed. The premolars are those which succeed the deciduous molars. The permanent teeth, the most posterior in position, which do not occupy places previously occupied by deciduous teeth, but which are themselves a backward continuation of the first series of teeth, being developed in the same primary groove of the fœtal gum, are the true molars.

From the dentition of early forms of both Herbivorous and Carnivorous Mammalia which existed during the eocene tertiary period, Professor Owen has been led to regard three incisors, one canine, and seven succeeding teeth on each side of both jaws as the type formula of diphyodont dentition. Of the seven teeth, four may be premolars succeeding four deciduous molars, and three molars; or there may be three premolars succeeding three deciduous molars, and four true molars. The latter type of dentition is peculiar to the Marsupials and Monotremes; the former is the typical formula of the placental diphyodont series, and in this series it is never exceeded. Amongst the few existing Mammals which have retained the typical number of teeth, are the Hog and the Mole. The permanent teeth in the genus *Sus* are indicated by the following formula:

$$i\,\frac{3-3}{3-3}\qquad c\,\frac{1-1}{1-1}\qquad p\,\frac{4-4}{4-4}\qquad m\,\frac{3-3}{3-3}=44$$

"When the premolars and the molars are below this typical number, the absent teeth are missing from the fore part of the premolar series and the back part of the molar series. The most constant teeth are the fourth premolar and the first true molar; and these being known by their order and mode of development, the homologies of the remaining which respect the *Cuspidati* are of a middle nature, between the *Incisores* and *Bicuspides*, as the last are between the *Cuspidati* and *Molares;* and thence the *Incisores* and *Molares* are the most unlike in every circumstance.* (*c*)

(To be continued.)

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molars and premolars are determined by *counting the molars from before backwards,—e.g.*, 'one,' 'two,' 'three,'—and the premolars *from behind forwards*—'four,' 'three,' 'two,' 'one.' The incisors are counted from the median line, commonly the foremost part, of both upper and lower jaws, outwards and backwards. The first incisor of the right side is the homotype, transversely, of the contiguous incisor of the left side in the same jaw, and vertically, of its opposing tooth in the opposite jaw; and so with regard to the canines, premolars, and molars; just as the right arm is the homotype of the left arm in its own segment, and also of the right leg in a succeeding segment. It suffices, therefore, to reckon and name the teeth of one side of either jaw in a species with the typical number and kinds of teeth: *e.g.*, the first, second, and third incisors; the first, second, third, and fourth premolars; the first, second, and third molars; and of one side of both jaws in any case." (1) The following formula therefore represents the homologies of the human teeth in relation to the typical formula: *i.* 1, *i.* 2; *c; p.* 3, *p.* 4; *m.* 1, *m.* 2, *m.* 3;—the third incisor and the first and second premolars being suppressed in Man, as they are also in the Catarhine Quadrumana. (2)]

(*c*) [The large size of the molars as compared with the incisors, canines, and premolars, and the regular gradation in size of the human teeth from the incisors to the molars, are amongst the dental characteristics which distinguish Man from the higher Apes.]

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(1) Owen, op. cit., p. 9.

(2) Owen, Art. Teeth, Todd's Cyclopædia, p. 904.

ORIGINAL COMMUNICATIONS.

A COURSE OF THREE LECTURES ON THE SALIVARY GLANDS AND SALIVA, INCLUDING THE ANATOMY, PHYSIOLOGY, AND DISEASED CONDITIONS OF THE SALIVARY SYSTEM.

DELIVERED AT THE COLLEGE OF DENTISTS, SESSION 1860-61.

BY B. W. RICHARDSON, M.A., M.D.

(Reported specially for the DENTAL REVIEW by Mr GEO. HENRY, M.C.D.F.)

LECTURE I.—TUESDAY, MAY 14, 1861.

[AFTER a few introductory remarks, in which Dr Richardson apologised for not carrying out his intended Course of Lectures on the "Chemical Pathology of the Teeth," owing to the lengthened period it would require to collect sufficient material for chemical investigation, he expressed the hope that the subject he had selected, "The Salivary Glands and Saliva," as it is one intimately connected with the teeth and the diseased conditions of the mouth, would prove interesting and useful to the members of the College. Dr Richardson then commenced his subject proper, as follows.]

Before I pass to the consideration of the special glands, I will give a general outline of all the glands of the body. The glands of the body are a series of rounded or irregular masses of tissue spread throughout the body, and destined for the secretion or alteration of some peculiar fluid from the blood. When we look at them carefully, the primitive facts are evident that glands are richly supplied with blood-vessels, nerves, and absorbents; and that they differ much in size, shape, and plan. We find some, for instance, are secreting glands; others produce no secretion whatever. Thus, glands are divided naturally into secreting and non-secreting glands. Of the first kind, the liver, kidney, and salivary glands afford good examples; of the second kind is the thyroid gland. Of those which throw off matter from the blood, some produce secretions, others excretions. The difference between these is this: a secretion is a substance, which is not only thrown out, but applied to some purpose; while an excretion is a fluid, separated and effete from the blood. We may further divide glands in different ways—according to their position in the body, according to their structure, or according to their function.

Having considered the glands generally, we will look at them first in an anatomical point of view. We will classify them—*i. e.*, as belonging to great tracts, according to the following table:

1. Alimentary.	4. Lachrymal.
2. Sudoriparous.	5. Mammary.
3. Lymphatic.	6. Genito-urinary.

7. Closed glands.

1. *Alimentary glands.*—Under the first of these heads—viz., the alimentary series,—we have the following glands between the orifice of the mouth and the rectum, all of which have one intention—alimentation. These are, first, the parotid, sub-maxillary, and sub-lingual, furnishing saliva; behind, in the pharynx, the pharyngeal glands; then, the œsophageal glands; next, in the stomach, a series of tubular glands, made up, as it were, by involutions of the mucous membrane,—gastric glands. After these we have the duodenal glands, first described by Brunner, and named after him. By the side of these, but out of the canal, we have a large gland, of great use in digestion, with a common duct entering into the duodenum,—the pancreas. A little forward, also out of the canal, we have another great gland for the production of bile—the liver, which also pours its secretions into the duodenal portion of the intestine: this is truly an alimentary gland, returning its secretion into the alimentary canal. In the ileum we have a series of small glands, called Peyer's patches: and, lastly, along the colon, we have simple solitary glands. With the exception of the liver, the construction of all the alimentary glands bears more or less of analogy to that of the salivary glands.

2. *Sudoriparous glands.*—Beneath the skin, we have another series of glands. In a section of the skin, we have first the external covering of epithelium, termed the cuticle or epidermis; beneath this, a layer of vascular tissue, named the corium, derma, or cutis vera; and then we have a quantity of connective tissue, with a little fatty matter, in which are imbedded several glands, each consisting of a small mass composed of one long tube, and called the sudoriparous or sweat glands. A modification of these is met with under the hair, as sebaceous glands.

3. *Lymphatic and Mesenteric glands.*—In man, and in many of the lower animals, we have a system of vessels called lymphatics, or absorbents: their use is to pick up matter from the substances taken into the body for general nutrition during digestion, or from the tissues, and to convey it into the venous circulation, near the heart, by means of the thoracic duct, which opens into the junction of the left internal jugular and subclavian veins. These lymphatics are not continuous tubes, but are here and there intercepted by glands. The tube entering the gland is called an inferent tube; the tube passing out, an efferent tube. All these tubes are valved, for the purpose of effecting the movement of the fluids in the proper direction—*i. e.*, towards the heart.

4. *Lachrymal glands.*—We find in the eyeball a certain series

of glands: (*a*) the lachrymal, producing the tears; (*b*) beneath the eyelids, a system of glands called the Meribomian glands, imbedded in the substance of the cartilages, and having the appearance of strings of pearls.

5. *Mammary glands.*—These glands are specially developed in the female for the production of milk, and they exist in the male as rudimentary glands only: some cases have been known, however, where men have secreted milk.

6. *Genito-urinary glands.*—In the genito-urinary tract we have a series of glands included in four: (*a*) the ovary in the female, surrounded by its external investment, and containing ova; (*b*) the testis in the male; (*c*) the prostate gland in the male; (*d*) the kidney, for excreting the urine. These four constitute the principal glands of the genito-urinary tract.

7. *Closed glands.*—Lastly, we have a series of vascular glands, called closed glands, no tubes leading either in or out of them. Of these are, (*a*) the spleen, the peculiar office of which is not as yet fully understood; (*b*) the thyroid, the gland which enlarges in goître, or Derbyshire neck; (*c*) the thymus in the child—we do not know the exact nature of this gland; (*d*) on the upper part of each kidney we have a body called the supra-renal capsule. It has been observed in cases of disease, that the skin has assumed a peculiar bronzed tint: this has been attributed to disease of the capsules in question. These closed glands are the profoundest mysteries to understand. I have removed the spleen frequently from dogs, also the thyroid, without the slightest evil result.

This is the view we take of the glands according to their situations. I will now pass on to a general view of the construction of glands. The great law with regard to construction is, that as much blood as is possible shall be brought to a point by fine blood-vessels, and exposed to a widely-extended secreting or elaborating surface. To perfect the process of secretion, the blood being brought, there are added to the glandular structures nerves which regulate the secretion, basement membrane, over which the blood-vessels are developed, and in some cases lymphatics.

In the closed glands these arrangements go no further. In the lymphatic glands, there is an addition—a specific duct entering the gland, inferent, and a specific duct going out, efferent. In the elimanating glands, such as the parotid, there is an efferent duct only. I shall confine all further remarks to glands of this latter kind.

The diagram before us gives a view of the construction of an eliminating gland, from its simplest to its most composite form. Let us take a simple gland: we find, then, that from some free surface, such as the mucous membrane, there is simply an involution of structure like the finger of a glove. This structure dipping down into the connective tissue beneath, becomes minutely surrounded with blood-vessels and nerves, constituting a simple tubular gland;

by elongation of this tubular involution and folding-up of the tube upon itself, the gland becomes composite, but the general principle is not varied. In other cases, as the diagram shows, the involuted portion of mucous surface becomes expanded as it dips down into a lobular form: in this way we have produced a simple lobular gland. But from off these lobules others may spring, lobule, as it were, extending upon lobule, and thus a composite lobular gland is the result; or, lastly, the involuted tube may divide into many branches, at the end of each of which a lobule may be mounted, constituting what has been called a racemose gland.

The observation of the glandular structures from this point of construction has led to the following classification of the glandular system:

1. Glands consisting of closed glandular vesicles which dehisce occasionally.
   Example: Ovary. 92
2. Glands composed of cells united into a network.
   Ex.: Liver.
3. Racemose glands, in which lobuled and elongated glandular vesicles are seated upon the ultimate end of an excretory duct.
   Ex.: (*a*) *Simple glands.*
      Mucous.
      Sub-mucous.
   (*b*) *Composite glands.*
      Lachrymal.
      Salivary.
      Pancreas.
      Prostate.
      Lacteal.
      Lungs.
4. Tubular glands.
   (*a*) *Simple.*
      Stomach glands.
   (*b*) *Composite.*
      Kidney, Testis.
   (*c*) *Lymphatic.*
5. Racemose aggregate glandular vesicles, opening into a common closed canal.
   Ex.: Thymus.
6. Blood-tissue glands, or glands which elaborate substances which are not excreted; a parenchyma of larger and smaller cells imbedded in areolar tissue.
   Ex.: Supra-renal capsules.

There is yet a further mode in which glands have been classified—viz., according to their use or function. This classification is simple; it divides the whole glandular system into four series, as follows:

1. Absorbent glands.
2. Eliminating glands.
   Ex.: Kidney.
3. Dehiscing glands.
   Ex.: Ovary.
4. Closed, or non-secreting glands.
   Ex.: Thyroid.

We have thus considered and classified the glands of the body according to their anatomical, their structural, and their physiological relations. There is only one other point to which reference need be made before studying the salivary glands specially: I mean the point "why individual glands should produce specific secretions?" Towards the solution of this question we have one primary fact, that the blood is the source of every secretion; but, as the same blood goes to every gland, it is obvious that the gland has in itself a selecting power. Does this power of selection lie in the mechanism of the gland? No; for two glands formed on the same general plan may produce different secretions. Thus, the salivary glands and the pancreas are constructed upon the same general system, and the sudoriparous glands and the kidneys are constructed on an analogous tubular arrangement; but the secretions respectively are different.

Is there any other arrangement to be considered? Yes. In the interior of glands, the whole of that surface which we have called the secreting surface is lined with epithelium, composed of the different varieties of cells known as tessellated, cylindrical or conical, and ciliated epithelium. Now, the cell has the specific property of producing secretion, and the whole process of secretion is obviously conducted through the means of some chemico-physical relationship existing between cells and blood. The nature of this connection is, however, yet altogether unknown.

Lastly, I would remark that apparently, as intervening between the cells and blood, and as governing the process of secretion by the cells, the nervous filaments present in all glands exert a peculiar regulating force, the influence of which in arresting or increasing secretion has lately been carefully inquired into, but the action of which is also unknown.

With these facts in our recollection, we shall be able at the next lecture to consider the salivary system specially in its anatomical and physiological relations.

LECTURE II.—Tuesday, May 28.

[After giving a general summary of his previous lecture, Dr Richardson proceeded with a special consideration of the organs of insalivation.]

The principal salivary glands, pouring their secretion into the cavity of the mouth, are three in number—the parotid, sub-maxillary, and sub-lingual; but, in addition to these, there are numerous smaller glands, as the buccal and labial, very simple in construction, and which open by minute pores over the surface of the mucous membrane of the mouth. These pores or papillary ducts consist of simple folds of the investing membrane.

Thus we have four classes of glands, known as salivary: (1) the parotid, so called from its situation near the ear; (2) the sub-maxillary, situated below the body of the lower jaw; (3) the sub-lingual, beneath the mucous membrane of the floor of the mouth; and (4) the buccal, spread over the surface of the mouth.

Parotid.—In order to expose the parotid gland for examination, it is necessary to make incisions anterior to and below the ear, through the integument and fascia which cover it. In this specimen now before us, we have a most perfect representation of the parotid gland. If we take the gland with regard to its boundaries, we find it limited above by the zygoma, below by the angle of the jaw, and by an imaginary line drawn between it and the sterno-mastoid muscle: anteriorly, it extends some little distance over the masseter muscle; posteriorly, it is bounded by the external meatus, the mastoid process, and sterno-mastoid muscles. If we turn to its position behind, we find that its inner surface dips deeply into the neck by two large processes, one of which extends behind the styloid process, and projects beneath the mastoid process and the sterno-mastoid muscle; the other is seated anteriorly to the styloid process, and passes behind the inferior maxillary articulation into the back part of the glenoid fossa: above, the gland is covered in by the skin and fascia. The external carotid artery perforates the gland, and the internal jugular traverses the deep portion of it, which is also in close relation with the internal carotid. The parotid gland is supplied with blood from the external carotid, and from branches of that vessel in or near its substance. It receives its nervous supply from two sources—both from the sympathetic and cerebro-spinal systems; the first, derived from the carotid pexus of the sympathetic; the second, from the superficial, temporal, and great auricular nerves. Thus, the auricular branch of the inferior maxillary division of the fifth given to the parotid, establishes a nervous communication between this gland and the teeth. But there is another source of nervous supply: around the carotid artery there are a number of nerves, called *nervi molles,* and many of these are distributed to the parotid. Such are the features of the gland itself; but we have not yet done with it. The parotid, or Sterno's duct, about two inches and a half in length, rising out of the gland, terminates opposite the second molar tooth of the upper jaw, after perforating the mucous membrane of the inner surface of the cheek. The facial nerve has a position under the gland, and the *pes anserinus* emanates from beneath. There are also lymphatics, which terminate in the superficial and deep cervical glands.

Sub-maxillary.—The sub-maxillary gland lies between the crossing of the muscles which form the sub-maxillary triangle. This gland is small as compared with the parotid, but in function it is exceedingly active. It is irregular in form, weighs about two drachms, and lies upon the mylo-hyoid, hyo-glossus, and stylo-glossus muscles. This gland is supplied with blood by the facial and lingual arteries, branches of the external carotid, and with nerves from the sub-maxillary ganglion of the sympathetic system. The gland terminates, like all other glands, in a duct, which goes along the floor of the mouth, and terminates by a papillary opening on each side of the frænum linguæ. The duct is about two inches in length, and its walls are much thinner than those of the parotid duct.

Sub-lingual.—The last of the larger glands that we have to consider is the sub-lingual, a small salivary gland, situated one on each side of the tongue. There is a broad difference between this and the other glands, in that it terminates in several small and separate ducts, from eight to twenty in number. This gland is supplied with blood from the sub-lingual and sub-mental arteries. The nervous supply is derived from the gustatory nerve, a branch of the fifth pair, and also from branches coming from the sub-maxillary ganglion. These are the several anatomical relations of the glands.

Structure.—As regards the structure of these glands, the specimens before us convey a very good idea. The salivary, as I have previously remarked, are conglomerate glands, consisting of numerous lobes made up of smaller lobules, held together by areolar tissue, and richly supplied with vessels and nerves. The lobules consist of closed vesicles opening into a common duct; the vesicular walls are formed of basement membrane, lined by epithelium, and covered externally with dense capillary network. Here we have a beautiful representation of the parotid, showing the termination of the ducts in little grape-like bodies, the lobules. These glands are all the same in structure, only that the lobes of the parotid are spread over a larger surface than in the sub-maxillary and sub-lingual glands.

SALIVAL SECRETION. *(a) Quantity.*—We now pass on to the secretion called saliva. The quantity secreted varies very considerably under different conditions: *e.g.*, a larger amount of saliva is produced during times when the blood contains more than usual of the materials designed to be separated, and during the primary stages of digestion, "mastication" and "deglutition." Certain harsh sounds and sensations, as that of setting the teeth on edge—the smell of roasting food to a hungry man, or even the thought of food—the habit of taking snuff, or smoking—and pain, as neuralgic paroxysms,—all these are causes which tend to excite an increased flow; also various important modifications may occur from an altered condition of the nervous system. The average amount of secretion may be twenty-four ounces in twenty-four hours, or one ounce per hour, in a healthy man: it is, however, very difficult to arrive at a correct estimate, and the greatest difference of opinion exists amongst authors as to the quantity secreted—a difference ranging from six to thirty-six ounces per day.

The *specific gravity* is given differently by different writers: it ranges from 1·0069 to 1·0089.

(*b*) *Reaction.*—The reaction of saliva in the normal state is always alkaline, but it may be acid in some conditions of disease. Some affirm that alkalinity is greatest during the time when food is being taken; others, that it is more so before food is taken. From my own observation, the maximum alkalinity is presented between meals.

(*c*) *Physical characters.*—Saliva decomposes very rapidly on being exposed to the air; in its recent state it has a thin, pale bluish-grey appearance. The blueness is due to the presence of epithelial cells and mucus. If you set saliva aside in a glass vessel, you will find that it separates into two parts—the one a clear supernatant fluid, the other a light-yellowish deposit, consisting of these epithelial cells thrown off from the surface of the ducts and vesicles, and from the mucous membrane of the mouth.

(*d*) *Analysis.*—The sub-maxillary and parotid salivas have been very carefully examined by various experimentalists, with a view to discover any existent differences. I am not aware of any difference in the properties of these salivas, and I think it is best not to enter into the difference of composition of the saliva from single glands, but of that taken from all the glands together. The following table, given by Frerichs, is the best:

Water	994·10
Solid Constituents . . .	5·90
	1000·00

Epithelium and Mucus . .	2·13	per cent.
Fat	0·07	,,
Ptyaline, with Alcoholic Extracts .	1·41	,,
Sulpho-cyanide of Potassium .	0·10	,,
Fixed Salts	2·19	,,
	5·90	

Looking at this table of analysis, we are struck with the large quantity of water present: this is peculiar to all secretions, for water is the great menstruum in which secreted substances are held. The epithelial cells are derived accidentally, as it were, from the mucous linings. Ptyaline is a remarkable body, presenting the peculiarity of a ferment—*i.e.*, it is one of certain substances, as diastase or common yeast, having the power of producing the fermentation of saccharine substances. Sulphocyanide of potassium, a combination of sulpho-cyanogen with potassium, is not found in any other secretion of the body: it has been asserted that it does not exist in the saliva, but the evidence is in favour of its presence. The chlorides of sodium and potassium, which, with the sulphate of soda and the lime-salts, make up the fixed salts, are very soluble, and generally found in small quantities only. The secretion is all derived from the blood, by the intimate agency of cells, capillary blood-vessels, and nerves. The glands select from the blood the constituents of saliva, and the tubes bring it for escape into the mouth. I mentioned, in my last lecture, that there is a basement membrane having a layer of cells, and that the cells have the power of selection. The sympathetic system of nerves controls, nevertheless, the quantity of the secretion, as is thus proved:—Suppose I divide the communication by severing the nervous supply of the parotid, the gland becomes more vascular, its vessels more dilated, and its secretion much increased: by irritating the branches of these nerves, we can produce the same effects. These sympathetic nerves govern, in fact, the calibre of the capillary vessels; and when they are cut off, the afflux of warm blood distends the vessels, and more fluid is thrown out: they regulate the supply, but not the selection, of the secretion; the selection is only modified by the cell construction of the gland.

We know now how to account for the influence which painful dental affections, harsh grating sounds, or keen and sensitive mental impressions and desires, may exercise in exciting an increased flow of the oral fluids: this influence is entirely subject to the influence of such cerebral impressions, through the medium of the great sensitive nerve of the head and face, the fifth pair, and the sympathetic branches with which it communicates upon the glands.

(*e*) *Uses of Saliva.*—There is one other essential point to consider with reference to saliva—is its object simply mechanical, or chemical as well as mechanical? The mechanical uses of saliva are obvious—it lubricates the mouth, and softens food. These uses are admitted; but it is urged, also, that it acts chemically on food.

We have three great divisions of foods: (1) the watery division, for forming a menstruum; (2) albuminous food, from which the muscular structures of the blood are built up; and (3) the amylaceous and fatty series, by which the combustion of the body is sustained. Now, the amylaceous compounds, in their course through the system as respiratory foods, go through various chemical decompositions until they are at last resolved in compounds, as carbonic acid and water. The primary change towards this ultimate change consists in the transformation of the starchy compounds into dextrine and sugar; and by many chemists it is asserted that this first process is commenced in the act of insalivation. In other words, it is assumed that the saliva possesses the properties of a ferment. Granting to the saliva, as a whole, this power, it has next been asked whether the fermenting property is resident in the secretion as formed by the whole of the glands, or in that formed by particular glands.

On this question we may enter into a variety of details, and illustrate by repeated reference to experiment the effects on starch of the secretions afforded by the individual salivary glands, and by the secretion from the glands altogether. The researches of Frerichs, of Bernard, of Bidder, and Schmidt, and of various other authors, on being collated and analysed, exhibit contradictions of results very singular in character, but not inexcusable, considering the immense difficulties and niceties of the inquiry. In the end, from a careful reading of all that has been done, and from such examinations as I have had time myself to execute, I am still much puzzled to read off clearly an explanation of the facts observed in all their entirety. I shall perhaps be nearest the truth in including in the following summary the present position of the question at issue.

Human saliva, as derived from the salivary glands, possesses the property of rapidly transforming starch into dextrine.

Experiments on inferior animals lead to the conclusion that the secretions both of the parotid and sub-maxillary glands have not individually this specific property.

The sub-lingual secretion has not as yet been sufficiently examined as to its effects.

The secretion from the buccal glands has not been isolated with sufficient care to allow of a determinate inquiry as to its properties as a ferment.

It remains, therefore, yet to be decided, whether the sub-lingual or buccal glands, either combinedly or individually, afford a secretion having the power of transforming starch into sugar, or whether for that effect, known to be producible by the saliva as a whole—*i. e.*, as derived from the whole system of salivary glands—is only attainable in the presence of the combined secretions.

THE DENTAL REVIEW.

LONDON, AUGUST, 1861.

In our last number we had occasion to refer to an article published in the 'Lancet,' on the College of Dentists and its Council. We exposed then the unfairness of this proceeding on the part of our contemporary, and hoped that, in moderate and friendly terms, we might reason him from the continuance of persecution.

Remembering that no class of public men had suffered more than the conductors of the 'Lancet' from misrepresentation and scandal, we were not without a hope that a sense of justice would ultimately prevail, and that, instead of making our College the subject of further splenetic attacks, the 'Lancet' authorities, if they still considered it their business to interfere with ours, would look before they leaped, and inquire into every fact before they recorded judgment.

But while we thus hoped, we were not without misgivings. Information such as we could not well disbelieve came to us, that our contemporary was being urged on to the attack by a clique of Dentists which, utterly unscrupulous in its statements regarding the College, spares no effort, nor subterfuge, nor cheat, to put it down. We knew, too, that this clique, annoyed beyond utterance at the continued success and progress of the independent movement, had a means by which to wedge its pretences into the columns of our contemporary, and, therefore, we were prepared for a second onslaught, which came in due time, based upon the very able and temperate letter of Mr Waite, published in our last number.

The tactics pursued in this onslaught are rather peculiar than powerful, and rather puzzling than effective. However, we must take the argument as it stands, and show its weakness not less than its intention.

Firstly, then, we would observe that the writer of the article in question ignores altogether the real objects of the College of Dentists, and the means which it is employing to carry out the intentions of its founders. All reference to the great principles advocated by the College, that Dentistry is a profession distinct from Medicine; that it is not to the honour of Dentists to be made half Doctors, and to be recognised by the Medical body as mere parasites, who cannot be met on equal terms or acknowledged save as intruders: those great facts, the points of our charter, this opposing writer leaves without a word of comment. In like manner, he lets alone all mention of the work which the College is performing as an educational establishment. It would not do for him to make any admission, even of labours patent to every other eye, so he maintains silence, and by a very unskilful use of the *suppressio veri* tries to convey the impression that the College of Dentists exists for no other purpose than to oppose the College of Surgeons, and to be a thorn in the side of a so-called respectable Dental clique, for whom it is being daily driven to feel more and more of sorrowful contempt; whose active little puppets it recognises at every corner, and whose more cautious and retiring masters are not altogether under a bushel.

But our opponent, as he must say something, begins by comporting himself with a quibble. Mr Waite, in his letter, states that the College of Dentists is "constituted"—mark the word, "constituted"—on the same plan as were other institutions which have ventured to call themselves Colleges. Here, says the astute critic, is a statement to the effect that the Council of the College of Dentists claims to be a chartered body, because forsooth these Colleges have since their origin become incorporated. It is scarcely credible, and yet it is a fact, that this interpretation, so wilfully untrue, is put forth against an analogy which is and was fairly set up by Mr Waite. Of course, Mr Waite never for a moment did such an act as protest, against facts, that the College of Dentists resembled the Colleges he named by possessing a charter; he could have done nothing so absurd: of course, he did mean that in "constituting" the College of Dentists, the same general political and educational principles were aimed at by its founders as were aimed at by the founders of the Colleges of Preceptors, of Engineers, and of Agriculture, and that these were nominally Colleges before they were incorporated. He might have doubled and trebled his illustrations, and still have kept true to his point—a fact which his critic knows as well as we do ourselves. It shows the feebleness of argument when men are driven to the devices we have thus been at the pains to disclose for support of their views; it shows the animus that prevails when such a specimen of double-edged logic can be brought to bear on the mere use of a word, indicating an establishment for educational purposes.

The next and only other point on which our contemporary bends to the attack is on the existence of Advertising Dentists on the books of the College. Here he is very grave, very dignified, very terrible. Not immortal Jefferson Brick himself, scissors and all, could be more solemn than is our contemporary's War Correspondent on this great subject. He collects as data that there are thirty men who advertise amongst the Members of the College of Dentists, four of whom he honours with special notice. To what criticism he exposes his own profession in this assumed morality, let him hesitate and think. For ourselves, let us for the moment, dropping all retaliative thoughts, take his denunciations and inquire into their real value.

We say it, then, without fear or shame, that while the question of advertising—its allowance after a given rule, or its disallowance altogether—is a question not to be settled by hasty words, it is to be admitted that there are a few men on the lists of the College who do put themselves apart from the rest of their fellows by their advertisements. These may plead that they do nothing so infamous as a certificated Dentist of the College of Surgeons whose filthy bill we printed a few months ago, and the excuse is plausible. But like does not justify like, so we cannot accept such excuse, and we urge that the Council of the College of Dentists cannot accept such excuse either. This granted, we have to ascertain what amount of error the present Council of the College has really committed.

When the College was constituted, there was a general union of Dentists throughout the kingdom, and many were admitted whose qualifications were not at the moment easily obtained. In December, 1856, a Committee of Scrutiny was formed. With one exception, the gentlemen who composed this Committee are now unconnected with the College, as all whom they can influence know; while one or two of them are obviously very much shocked at advertising in every shape, for they proclaim the same almost from the housetops, and to prove their fidelity to their mistress Virtue, would bring to her feet Prester John's beard by a hair at a time, or draw her chariot to church with unicorns. Well, these gentlemen made up a Scrutiny Committee, and amongst other names brought before them for their approval or non-approval were the four whom the 'Lancet' now especially signalises. Two of these the Committee admitted as fitting Members; the other two they let pass, by not rejecting them. The result has been, that the four gentlemen named by the 'Lancet,' having been subjected to the scrutiny of a former Council, and having passed through the ordeal successfully, and no charge having been since brought against them, the present Council has felt a difficulty in taking the initiative in erasing their names from the list of Members, or, indeed, in erasing the names of any Members who were passed as eligible by the Committee of a previous Council. Had any complaint been lodged against the proceedings of these gentlemen to the Council, an investigation would at once have been instituted, as has been instituted in other cases, and, guided by the evidence, would have adjudged fairly and rigorously on the question of expulsion.

And thus this bubble of an objection about advertisers, brought against the College of Dentists, comes to nought. It is mere badinage, witless and cruel. If the writers of the 'Lancet' would turn to their own provinces, to the Medical Colleges and their Advertising Members—if, for example, they would urge the College of Surgeons to take the gentle name of Griffiths Jones from off its roll, and not to admit bill-distributors to Dental practice and indirectly to Medical,—they would be doing a better work than in attacking men who are just as honest and as earnest in intention as themselves.

To the Members of the College of Dentists we would address a word of sympathy and promise. Let us beg them to take no heed whatever of these attacks. We know what use is attempted to be made of the insult. We know how one gentlemanly and knightly foe, whose name is utterly unknown in the streets of the Metropolis as connected with Dentistry, has framed and glazed, and put, we had almost said, in a show-case, one of the articles which, probably at his own instance, appeared against his political opponents. We know how, as at a mirror, he admires himself before this lucubration, and puts on airs to friends and dreadful scowls to foes. But the simple truth is, that all these violences and strained efforts are but so many evidences of the real and unmistakeable influence which the College is daily exerting. If the institution is so powerless as its enemies make it, why do they fret and fume at every turn, and eat dirt that they may live to put it down?

Let the Members of the College rest assured that, practically, every persecution produces investigation, exposes motives, excites union, and strengthens their cause. Lastly, let them give to every opposition its counter; and with the one principle of independence fairly in their minds, and with their labours kept safely within their means, they are sure not only to become the acknowledged representatives of Dental Science and Art in this country, but to be rewarded with all the honours of success, when even enemies shall turn round to fill their ranks, and friends rise out of the very ground.

SELECTED ARTICLES.

ON DENTAL PHARMACY.

By Edward Parrish.

(From the 'Dental Cosmos' for July.)

There is no class which comes more directly in contact with the public than pharmaceutists, and none having more frequent opportunities to inculcate hygienic truths, or to give direction to the use of remedies among the ignorant: that these opportunities are often neglected, and even abused for the purposes of gain, forms no exception to the ordinary evidences of human frailty. But besides his more ordinary pursuits, every pharmaceutist of recognised ability is often consulted by his friends of the kindred professions in regard to the physical and chemical properties of drugs, and their modes of application. These he will answer well or ill, according to his proficiency; and if he would thoroughly fill up the requirements of his position, he must inform himself of the chemical and pharmaceutical requirements of every branch of science which borders on his special domain.

The points where the professions of dentistry and pharmacy touch each other are not so numerous as those which have given to pharmacy the character of "the handmaid of medicine;" and yet there can be no doubt of the utility of a limited knowledge of this art to the dentist, while a certain acquaintance with what might be called dental therapeutics is almost essential to the pharmaceutist.

Tooth-drawing, which is still largely practised by barbers (a barbarism in a twofold sense), is justly esteemed by dentists as requiring the exercise of their highest judgment; and yet how often is it resorted to through ignorance, when an intelligent precaution would save the patient much suffering and an irreparable loss! The custom of applying to the apothecary for palliatives in advance of the last resort gives him an opportunity to advocate a conservative practice which may be greatly to the interest of the sufferer. In the selection of palliatives and other applications, there is abundant room for the exercise of judgment and skill; and here, too, the intelligent pharmaceutist should be able to serve the dentist by hints founded on a more intimate and thorough acquaintance with remedies than generally falls to the lot even of those entitled D.D.S. A slavish regard to authorities is the main check to the progress of professional knowledge; the mind not fired with a zeal for experiment is easily satisfied with the few facts which its limited vision takes in; and it is only as principles are applied to facts which are known that we can climb up to those which are unknown. Dentists seldom look enough into materia medica; the fact that creosote, tannic acid, chloride of zinc, arsenious acid, morphia, ether, and chloroform constitute almost the only remedies usually met with in the offices of dental practitioners, indicates an ignorance of the resources of the materia medica by no means consonant with their acknowledged acquaintance with the anatomy, physiology, and pathology of the organs of mastication, and their skill in the mechanical parts of their art.

It must be acknowledged that the classes of remedies acting primarily on the brain and nervous system are too little known, even by physicians; though a wonderful advance in this respect has marked our times, and it is believed that they are now more used in practice than ever before. The modern classification of these into narcotics, which primarily stimulate the brain followed by sleep, nervous stimulants or antispasmodics, excitomotor stimulants, nervous sedatives, which are found so very useful as local applications, and arterial stimulants and sedatives, has produced its legitimate fruit in a more intelligent and more general use of them in practice. Should not dentists, who have so much to do with a certain class of painful nervous affections, acquaint themselves practically with every remedy known to exercise a controlling or modifying effect upon the subtle causes of sensation?

It is not my object in the present essay to pursue this suggestion further, believing that the readers of the 'Dental Cosmos' are generally of the class least requiring to be taught how to seek available knowledge. The same train of remark might be applied to the use of astringents and tonics, to which useful classes modern pharmacy has furnished important additions in some of the recent preparations of iron, and in several elegant vegetable remedies.

In this connection, a few hints may be dropped in regard to tooth-powders and washes, the name of which is legion. Myrrh was formerly the basis of most of these, and is still much prescribed by dentists; but I would submit the question to the intelligent reader, whether it is well selected. It is an astringent with gently-stimulating qualities, quite desirable in treating relaxed and flabby conditions of the gums, and a resinous character, which adapts it, by clogging up the bleeding vessels, to check hæmorrhages. None of these properties fit myrrh to the purposes of a daily, or even frequent, tooth-wash. The flabby condition of the gums is by no means a universal complaint, and any extensive hæmorrhage from them is quite rare; while the tendency to accumulate deposits of tartar and of foreign substances upon the teeth, and between the teeth and gums, is a disadvantage which needs to be constantly counteracted. Tincture of myrrh has no particular uses in this connection, but, by leaving an adhesive, varnish-like deposit on the teeth, would seem to have an unfavourable effect on their cleanliness.

For general use as a tooth-powder, chalk seems to me to be without a superior; when perfectly levigated, as in the finest qualities of *creta præparata*, it possesses no gritty particles capable of injuring the enamel, is sufficiently soluble in the saliva to be prevented from accumulating in the interstices of the teeth and gums, and, possessing no unpleasant properties either of colour or taste, may be delicately flavoured and made agreeable to the eye. Charcoal, which is so highly recommended by some, possesses but one merit—that of absorbing with great facility any unpleasant or injurious secretions. It is, like all vegetable powders, objectionable from its complete insolubility and consequent tendency to form the nucleus for deposits on the teeth. The common kinds of charcoal have the further disadvantage of a coarseness of grain which is obviated in betel-nut charcoal, and perhaps other kinds, especially popular in England.

In the manufacture of tooth-washes, or rather mouth-washes, there is considerable scope for ingenuity, always keeping in view the two objects—cleansing the teeth, and imparting a pleasant taste and odour to the mouth. There is a class of drugs only lately coming into notice in this connection, which, with other qualities, combine a soapy and detergent property, due to a peculiar vegetable frothing principle, called *saponin,* and its analogues. The quillai bark of South America is used by the ladies, where it is known, for the skin and hair. A West India plant believed to contain *saponin* is also much sold in Jamaica, in small sticks, for cleaning the teeth, the end being softened so as to resemble a brush. Our own soap-wort, *Saponaria officinalis,* probably contains the same principle, and might be adapted to this use. A tincture of quillai I have found an elegant basis for a tooth-wash, to be dropped on the brush, which, from its frothing and cleansing properties, is universally popular where it is known. A weaker preparation, with a rich flavour, to give the breath an agreeable fragrance, to be used for rinsing the mouth after the free use of the brush, is preferred by some. I know of no disadvantage resulting from the pretty free use of such washes, and believe the additional cleanliness imparted by them to the teeth and mouth a positive advantage in many instances.

Finally, do not dentists require a closer affiliation with pharmaceutists for mutual advantage and improvement, and should there not be a recognised pharmaceutical specialty introduced into the arcana of dentistry? In their direct and constant intercourse with the public, and practical familiarity with remedies and their modes of preparation and modification, the "knights of the pestle and mortar" have many facilities for serving the interests of dentists and for promoting the progress of dental science.

TREATISE UPON THE GENESIS AND DEVELOPMENT OF THE DENTAL FOLLICLES TO THE EPOCH OF THE ERUPTION OF THE TEETH.

By Drs Ch. Robin and E. Magitot.

(Translated for the 'Dental Cosmos,' by E. Sureau.)

(Continued from page 281.)

III. The Submucous Gingival Tissue of the Fœtus, or the Contents of the Dental Groove.

Below the dissectable mucous membrane described above, there is a thick bed, formed of a tissue compact in texture, and covered with a mosaic-like epithelium; this tissue is soft, almost sticking or stringing between the fingers, and of a more or less reddish, gelatiniform appearance.* This tissue is in continuity of substance with the mucous membrane, and extends to the bottom of the groove of the maxillaries, where it moulds itself, while filling it exactly through its whole extent. It is in immediate contact with the osseous tissues of the walls of the latter. It rests upon them in some measure at the bottom of the grooves only, and as far as the ulterior development does not occasion the formation of the partition which separates the dental nerves and vessels from the follicles.

This tissue is composed of fibres and bundles of laminated fibres, very loosely united and intercrossed by vessels. These elements contain a considerable quantity of very pale and very slightly granulated amorphous matter in their straggling meshes. This peculiarity gives this tissue great transparency, and the observer can follow with great facility those capillary vessels which cross to the common fasciculus of the nerves and vessels of the jaw. In the depth of the mucous membrane, as in that of the submucous tissue, there are a great number of embryoplastic nuclei, especially visible after the employment of acetic acid. These nuclei are much more easily observed and isolated in the submucous tissue, on account of its transparency. As to its thickness, it diminishes in the proportion that the follicular evolution advances ; so that at birth, for example, when the follicle is well developed, the submucous tissue, which we may say has served for its formation, has disappeared almost entirely. There is, however, a certain portion left, which can be found under the gum wherever the follicles are not united to it ; so that the mucous membrane, like all the rest, remains constituted by its chorion, or derma of the mucous membrane, and its submucous tissue.†

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* No description of this tissue has yet been given, or at least with but little exactness. Henle confines himself to saying that the follicles are separated merely by a soft substance that strings between the fingers. (*General Anat.*) M. Guillot, who has noticed it in some hard, preserved sections, does not distinguish the chorion or web even of the mucous membrane of this tissue, and gives the epidermis as being the entire mucous membrane. He is wrong in saying that this tissue is at first composed of a very compact and condensed mass of cells or nucleiform molecules, similar to those from which the bone and periosteum arise, for the reason that it becomes fibrous. He does not decide, either in one way or another, the question whether this part is or is not a periosteum of depth or of modified forms. He is incorrect in saying that it is difficult to determine its limits exactly. He calls it the *odontogenic part*, or the *generating part* of the teeth, and also the *odontogene*—(Recherches sur la Genèse et l'Evolution des Dents et des Mâchoires ; *Annales des Sciences Naturelles*, Paris, 1859, 8vo, vol. ix., pp. 282-288)—but it is not here a peculiar kind of tissue.

† The tissue, which fills the dental groove at the time of the genesis of the follicles, and for a considerable time afterward, has the same characteristics of anatomical composition and texture as are found in the subcutaneous tissue, where the pilous bulbs originate, and in the submucous tissue of the

The dental follicles and bulbs originate in this tissue, near the vessels and nerves above mentioned, and, consequently, not far from the bottom of the groove. This tissue diminishes gradually in quantity when the follicles are developing; when the roots of the teeth have appeared, their crowns slowly issue from the bottom of the groove; at the same time the osseous partitions, which spring from the thickness of the internal face of the walls of the latter, are formed between the teeth and their roots: the result is, that the groove disappears as a groove, although it continues to lengthen and even to broaden as a canal. It is closed in this manner at the bottom, and remains merely in the form of a dental canal. From that time there is a gradual diminution of quantity in the submucous tissue, which becomes atrophied before the osseous invasion.

Finally, the groove diminishes in proportion as the follicles become developed, and as they gradually fill the groove and the cells into which it is subdivided.

As we are now acquainted with all the organs and tissues which are in connection with the follicles and teeth at the time of their origin and during their development, we may enter upon the study of these phenomena, which are so important and so difficult to follow.

CHAPTER SECOND.

GENESIS AND MORPHOLOGY OF THE DENTAL FOLLICLE, FROM ITS APPEARANCE TO THE BIRTH OF THE IVORY.

We will now turn our attention to the tissues and organs which originate in the jaws before the dental bulbs, at the heart of which appear the follicles, and the development of which, from that time, corresponds with that of the latter organs.

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lips and other parts of the body where the glands originate, as the follicles do in the former. It is, therefore, not a peculiar species of tissue, and it consequently has no more title to a particular name from the solitary fact that it fills the maxillary groove, than the submucous and subcutaneous laminated tissues have from the fact that the pilous follicles and glands originate in them before they emerge upon the exterior through the integuments. At the same time that the follicles are developed, the fibro-plastic bodies of the submucous tissue change to the condition of laminated fibres, properly so called; it becomes more dense, whitish, less transparent, and is without elastic fibres. It adheres more strongly to the walls of the groove and the alveoli than it did before, so that a little while before birth it forms a real periosteum for them, which is found immediately under the bone when the follicles are dissected by the removal of the laminæ of the maxillary bones. At birth, and for some months after, it does not adhere very much to the proper wall of the follicle, so that the whole of the latter can be detached from it. It forms in some degree a second coat or whitish wall, more resisting, less transparent, and less vascular than the proper wall, which is truly simple. Later, this periosteum (the remnant of the submucous tissue immersed in the groove) unites with the follicular wall, and, combined with it, forms the alveolo-dental periosteum.

In the first paragraph of this chapter we will consider the order in which those follicles appear which exist at the period of accouchement. We will publish in another work the result of our researches upon the time and precise place of the appearance of the follicles of the permanent teeth in relation to the temporary ones.

We will point out, in the second paragraph, the manner of the genesis of the bulb, of the follicular wall, and of the organ of the enamel, which are, at least in man, the only constituent parts of the follicle considered in its entirety as a single organ.

The following paragraphs will be devoted to a description of the phenomena of the evolution exhibited by each of the constituent parts of the follicle.

That which strikes us most in the consideration of this subject is the uniformity of appearance and intimate constitution of all parts of the follicle, in the various species of animals, at corresponding ages; the shape and size of the follicles differing only as much in each kind of tooth as in each species of animal.

Section 1. *The order of the appearance of the follicles in the groove of each jaw.*—The follicles which originate first are, as we have said, those of the lower jaw—those of the upper being a little later. We have proved this fact in all the mammiferæ that we have examined.* In consequence of this, at the time of the eruption of the teeth, the development of the lower follicles is always a little more advanced than those of the superior maxillary. We will also see that the ivory appears on the surface of the bulb of the former a little before it is produced in the latter.

It is, as has been stated, near the sixtieth day of the human fœtus that the first follicle shows itself in the lower jaw, and about the sixty-fifth day in the upper.

Thus the follicles do not appear at the same time in the two jaws, or in either of them in particular; but the order in which they originate in the one is reproduced in the other. This fact is observed in all the mammiferæ; but in order to find which tooth is the first to appear in each of them, it is necessary to make direct observations—for the reason that in some of them it is an incisor, as in man; in others it is the canine, as in the hog; or a molar, as among the ruminating animals. In the case of the latter, this fact coincides with the absence of the incisors in the upper jaw.

If we consider the order in which each of the constituent parts of the follicle appear in particular, we will find that the bulb always originates first; the wall very shortly after, but still a little after; and in the last place, appears the organ of the enamel, as soon as the follicular wall is closed.* In all of them the development of these constituent parts, and consequently that of the follicle, is effected in the same order of similitude and succession. It is in the follicle which appears first, that the follicular wall closes, the organ of the enamel appears, the ivory originates, and the enamel after it. These phenomena are accomplished in the same order in the second follicle, but a little later, and also in the others, in every species of mammiferæ or of tooth; we do not find that a follicle originating before another is outrun by the latter in its primitive original development. But it is important, at present, that we should not confound that which relates to the development of these parts of the follicles with that which concerns the tooth, as a resistant organ, having a crown or exterior part, and a radical or deeper portion. It is an established fact that each tooth once produced, as far as the ivory and enamel, follows a method of evolution proper to itself, and as distinct from the manner of development of the follicle, as the ivory is from the tissues which form the follicle. This development differs in the teeth according to their size and degree of complication. For example, in the calf, the crown is more rapidly completed in the incisors than in the molars, which are larger and more complex, notwithstanding the fact that the dentine appears in the former a considerable time after it appears in the latter. Thus, among calves, the eruption of the incisors is, nevertheless, commenced at birth and completed in a month, much before the eruption of the molars.

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* Some authors are mistaken in asserting that the follicles of the lower jaw appear a little later than those of the other. (Vide Henle's General Anatomy.)

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* M. Oudet and several other authors have said that the parts first formed are the membranes of the dental follicles, and that it is at a more advanced period, in the course of the third month, that a small yellowish body, the pulp, is developed at the extremity of the vessels of the follicle. This pulp, rising little by little, lifts the internal membrane, which in this manner becomes its exterior envelope. (Oudet, loc. cit., 1835, p. 98.) We will show that this opinion is incorrect. Raschkow is also wrong in saying that the wall appears first, followed by a nucleus formed of corpuscles or *angular grains bound together by fibres;* he names it *the organ of the enamel,* and makes it originate before the bulb or dental germ. He remarks that the wall is vascular from the beginning, especially on the side of the dental nerves and vessels where its capillaries reach it. (Raschkow, 'Meletemata circa Mammalium Dentium Evolutionem;' Vratislaviæ, 1835, p. 12.) M. Guillot admits that the follicle originates by a mass which he calls the *initial spheroid* or *primitive trace* of the teeth; that three distinct divisions rapidly appear in these spheroids by a sort of partition. One of them is central, and he calls it the *nucleus* or *noyau,* a name of ambiguous signification—it is the dental germ or organ of the ivory. The second is situated around the other, and is the middle *zone* or organ of the enamel. The exterior third one is organised in a fibrous sack when the germs of the ivory and enamel have been for a long time formed in the generating part; later still, it becomes vascular. (Guillot, loc. cit., 1859, vol. ix., pp. 289 to 297.) It will be proved hereafter that these phenomena do not occur in this manner.

Eruption is, then, a phenomenon which is subordinated especially to the development of the tooth as an organ, and is not in absolute connection with the origin and development of the follicle itself. This phenomenon is complicated, moreover, by all that belongs to the development and to the atrophy of the maxillaries and gums, as is shown by the eruption of the wisdom tooth. In consequence of this, the appearance of the teeth does not occur in all animals in the same order as the birth of the follicles to which they correspond. One of these phenomena cannot, therefore, be judged strictly by the other.

On the contrary, the regularity with which the essential parts of the follicle succeed each other, and complete their own development, according to the order of their first appearance, enables us, where several follicles are united side by side, to be certain that those most developed in structure are the oldest, even when they are of less size than some of the others.

In the practice of anatomy, accordingly, the one which appears first is the only matter of difficulty in determining the precise period of the appearance of the follicles. This point once fixed, the degree of advancement of those found at its sides at a subsequent period, is in itself sufficient to show the time of their origin in comparison with that of the first.

In the human fœtus the follicles appear in nearly the same order as the issue of the corresponding teeth, for each of the jaws considered individually. Thus, the follicle of the anterior molar and that of the internal incisor appear at nearly the same time, and the dentine afterward shows itself in both simultaneously. The external incisor follows them closely, the posterior molar comes a little later, and the canine last; it continues for a long time situated on a plane, which is nearer to the corresponding dental nerves and vessels than to the others.*

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* According to Henle, the follicles appear in the following order : anterior molar, canine, internal incisor, external incisor, posterior molar. But this is not correct. M. Oudet had already pointed out, following M. Serres, (loc. cit., 1835, p. 441,) 1st, that at the beginning of the third month the follicles of the two incisors and of the two molars are separated by quite a large interval ; 2nd, at the end of the third month the sac of the canine is discovered in the midst or beyond the interval mentioned above ; 3rd, at the end of the fourth month appears the sac of the first large permanent molar. We have seen that the follicles originate sooner and in a somewhat different order. He says also, as did Hunter, (1771,) and it has been repeated by many other authors, (Goodsir, &c.,) that in the course of the seventh month the sacs of the permanent incisors are distinctly visible, and those of the canine and the second large molar a little later. In man, it is only at birth or a little before it, as we shall find, that the incisors and permanent canines originate at the side of the others. We cannot, therefore, agree with M. Guillot, that in the human embryo, at the age of three months, the initial follicle of the incisors of the second dentition is already visible at the side of those of the first. (Loc. cit., 1859, vol. ix., p. 312.)

The number of follicles of the first dentition is now complete. This takes place near the seventy-fifth day in the lower jaw, and about the eightieth in the upper one. A new follicle now originates at the posterior extremity of the maxillary groove, almost immediately behind the follicle of the larger molar. This new follicle is that of the first permanent large molar, which emerges, as we know, about the sixth year. This follicle makes its appearance in the lower jaw at the eighty-fifth day, and varies in the upper jaw from the ninetieth to the ninety-fifth day after conception. As to the teeth of replacement, some are produced only a little before birth, and sometimes a little after; and the others after birth, at longer or shorter periods.*

In the hog, the follicle of the canine appears earliest at the time when the fœtus is about 2·56 inches from the vertex to the root of the tail. The large middle molar of the first dentition appears almost as soon, and, at the same time, the large or middle incisor.

In the ruminating animals, such as the calf and lamb, the first follicle is that of the first large molar, near the time when the lamb is about two and a half inches, and the calf three and a half inches in total length.. These dimensions correspond nearly, in the two species, to the twentieth and twenty-fifth day after conception.

During the time that the molars of the ruminating animals are being developed, there is a simultaneous evolution of eight of the incisors.

It is easily seen that the follicles of the two large or middle incisors originate after that of the first large molar, and nearly at the same time as that of the second false molar, while the follicles of the two last or small incisors correspond to the appearance of the follicle of the second large molar.

Section 2. Mode of genesis of the dental follicle.—It has been already stated that all parts of the follicle do not originate at the same time—that the bulb comes first, the follicular wall next, and the organ of the enamel last. Their origin is by the mode called *genesis*.

The precise place where the follicles have their beginning is worthy of attention. The bulbs do not have their commencement close to the dental nerves and vessels already existing, but a little above them in the thickness of the sub-mucous tissue that fills the groove, and nearly at the middle of the depth of the groove. The base of the follicle afterward draws a little nearer to these vessels and nerves, when that organ grows larger.

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* Bischoff says that the "edge of the maxillary of the fœtus is very thick and swollen, because it contains the germs of the milk teeth, and even some of those of the permanent teeth;" that "the first rudiments of the permanent teeth appear at a very early period, and all of them during the embryonic life." Further on we shall see that this hypothesis is not more correct than that one of Goodsir, according to which the follicles of the permanent teeth are developed as by small recesses of the mucous membrane, being produced from the fourteenth to the fifteenth week of the intra-uterine life, but which become complete cavities before enclosing a bulb, which bulb shows itself there, however, only from the fifth month.

It is interesting to follow the general phenomena of this genesis before directing our attention to its details.

A little before the birth of the first vestiges of the bulb, the corresponding part of the sub-mucous tissue, which fills the maxillary groove, becomes more opaque and especially more vascular than the surrounding gelatiniform tissue. The increase of opacity at this point depends upon an accumulation of fibro-plastic nuclei, and upon a relative diminution in the quantity of amorphous matter.* The vascularity of this point becomes at the same time considerable. The capillaries, indeed, form some polygonal meshes of about twice the diameter of the limiting capillaries. These nets are very distinct from the neighbouring ones, on account of their abundance and their configuration, and they form in their totality a band answering exactly to the level of the tissue, where the development of the follicles must occur. These nets are a little prolonged near the bottom of the maxillary groove, in the shape of round festoons, which give the vascular band an undulated appearance. A small obscure mass appears in the middle of each of these festoons—these masses are the bulbs; in the ruminating animals those of the four large incisors appear first, and the four small ones afterwards. At the beginning, these bulbs are nearly round, the transverse diameter being greater than the vertical; the lower edge is distinctly marked, while the upper edge remains diffuse. When the bulb reaches a certain size, a dark greyish band is formed around it—this represents the follicular wall. The band, after circumscribing the base of the bulb, is lifted above it a distance which at the highest point is nearly equal to its own height in the ruminating animals, but the distance is very much less in man and in the hog. This band indicates the presence of a sac, but open on the side of the mucous membrane, and the free edge of which reunites with itself a little later, so that, at the time, the follicle is shut, and its cavity is soon divided exactly into two parts—for the reason that the organ of the enamel originates as soon as the occlusion is effected; the lower part is occupied by the bulb, and the upper is filled by the organ of the enamel. When the follicle is thus completed, it presents, in the incisors and canines, an ovoid shape lengthened vertically. The bulb then increases considerably, and becomes of greater height than breadth; the summit, at the same time, assuming the form of a cone a little flattened from before backward, in such a manner that the organ exhibits the external configuration of an angle similar also to that of the future crown.

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* Raschkow (1835) has shown that the follicle or dental sac originates under the mucous membrane, and not by its destruction. The sac is at first free from all communication with the gum, but adheres to it at a later period both directly and by the aid of vessels. It is these adhesions which, seen at a more advanced epoch in the evolution of the follicle, have been incorrectly considered to be primitive, in accordance with the old hypothesis of the pretended production of the latter by the destruction of the mucous membrane. They have also been supposed to be hollowed out of a canal then called *gubernaculum dentis* and *iter dentis.* In spite of the exactitude of the descriptions of Raschkow, these opinions have continued to be held at the same time as the hypothesis of Goodsir; but they have been opposed by M. Guillot (loc. cit., 1859, vol. ix., p. 287-290). Raschkow has also noted that the pretended *cartilago dentalis* of the gums does not contain the elements of the cartilaginous tissue, but a thick epithelial bed upon a thick mucous membrane.

From the time that the follicle of the molar is completed by the occlusion of its wall, the diameter, in man, is nearly equal in all directions; but it soon becomes broader than it is high. In most of the other mammiferæ, it shows this particularity from the time of the occlusion of its wall: it is nearly ovoid in the direction of the length of the jaw, and not in the direction of its height.

A short prolongation of the wall is seen at the summit of all these follicles a little after the occlusion of the wall, and at the side where the wall has been. This prolongation is formed, like the wall itself, of fibres and vessels. It crosses to the mucous membrane, and its own capillaries are anastomised with those of that membrane.

In all the mammiferæ and in the reptiles, the bulb at this period shows itself in the form of a small, greyish mass, a little darker than the surrounding tissue, from which it is not separated by anything—it is even in continuity of substance with it at the base. But the remainder of the periphery, although immediately contiguous to it, is easily detached, and has a smooth and very clearly defined surface. The greyish colour of the bulb, and its want of transparency, in comparison to the surrounding tissue, arises from the fact that it is formed, from the time of its appearance, of finely-granulated ovoid nuclei, which we will speak of hereafter. They are separated from each other a little, by a small portion of amorphous matter, which is more granulated and much less abundant than in the surrounding tissue.

At the time of their origin, as has already been stated, the bulbs of the incisors and canines are shaped like a cone, more or less elliptical; and the bulbs of the molars are entirely blunt or merely bulged, and much broader at the base. At the time that it appears, the bulb is from two to four-tenths of a millimetre in height, and soon reaches from five to seven-tenths at the base, being not quite so broad in the incisors and canines, and almost double this size in the molars.

Thus in the embryos of the mammiferæ, such as man, the hog, the calf, and the lamb, at the time above mentioned, a small, opaque mass makes its appearance in the midst of the soft and transparent sub-mucous tissue. This little mass is composed principally of the ovoid nuclei above mentioned. It is the dental bulb. The base or deeper part is, from the time of its appearance, quite distinctly marked by a semicircular curved line, while the opposite portion is still confounded with the surrounding tissue; but it also is clearly defined a little later. The bulb then acquires a different shape in every species of tooth; its rounded base blends itself insensibly with the rest of its surface. When the outline of the summit of the bulb is marked, a greyish band disengages itself circularly from the base or deeper part—it is darker than the surrounding tissue, but of a lighter colour than the bulb, and has a diffused outline. This dark line appears at the very time that the outline of the summit of the bulb is marked, or a little later; and it represents the follicular wall, which is beginning to appear, and which will soon circumscribe the whole bulb, with the base of which it is in continuity of substance.

Thus, in the beginning, the circumference of the base of the bulb is not yet separated by anything from the rest of its extent—their surfaces blend with each other without interruption. But a short time after the origin of this little organ, some filaments are delineated at the circumference of the base; these are darker than the surrounding tissue, without having as little translucency as the bulb, with the tissue of which they are in continuity of substance. They also interrupt the continuity of surface which exists between the base of the bulb and the rest of its extent.

They soon form a small, greyish band not quite so dark as the little cone itself: the band is in direct contact with the surface of the cone, but the least pressure of the plates of glass separates them. In this maner the band circumscribes the surface of the bulb, without being yet closed at the side of the summit: this will soon occur, however, and without its being turned below the base, from the circumference of which the band starts, as will be shown.

This little conical mass is the dental bulb, and the small, greyish band is the wall of the follicle. The bulb appears first, and the follicular wall shortly afterward.

The dental bulb or germ of the ivory, and subsequently the follicular wall—fundamental parts of the follicle—are the first to appear.

During the periods of evolution which follow the birth of the bulb and of the follicular wall, these two parts acquire a more distinct and better determined form. The greyish band is still more exactly distinguished from the neighbouring parts; it withdraws a little from the surface of the bulb, and its extremities reunite at the side of the summit of the latter, in order to form a cavity closed throughout, and into which the projecting part or summit of the bulb is plunged.

The appearance of the follicular wall in the heart of the submucous tissue is accompanied by an exaggeration of vascularity. The capillaries, which are thus produced around and in the interior of the wall, are disposed in quite regular polygonal meshes, starting from the base of the follicle and reaching nearly to its summit. The repletion of these vessels is sometimes such as to cause an opacity in the fresh preparations, which is dissipated only at the end of some hours, or by the employment of glycerin. It is only a little later, but always before the moment of the appearance of the first cells of origin of the dentine, that the vessels and afterward the nerves are developed in the depth of the bulb: until then, the tissue is formed only of the elements which have been mentioned.*

Between the inner face of the wall and the surface of the projecting part of the bulb thus modified, the organ of the enamel originates and is developed during this time. It exhibits the appearance of a clear, transparent mass. It has no continuity of substance with the wall, to which it is only contiguous and adherent at the surface of the bulb, from which a pale and white line separates it shortly after its appearance: an attentive examination shows that this line is formed of a continuous range of the cells of the enamel.† In almost all of the mammiferæ this organ has the same general disposition; that is to say, it exactly fits the whole projecting part of the bulb, after the manner of a soft gelatinous plate of nearly the same thickness at all points, and that might be extended upon a mammillated surface. A transparent zone, varying in extent according to the species of animal or the nature of the teeth, appears between the surface of the bulb and the wall, a little after the occlusion of the follicular wall at its summit. This zone, which is so transparent that it might be supposed to be filled with liquid, is occupied by the organ of the enamel, which is always very translucent, but is especially so at the period when it is about to become apparent. It is important that this zone should not be confounded with those interstices which the pressure of the glass plates produces between it and the wall, by the separation and distention of the latter. These interstices are filled with the liquid of the preparation.‡

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* Raschkow (1835) was the first to note that the production of the vessels and nerves is posterior to the appearance of the bulb.

† Raschkow's *membrane of the enamel* (1835). He considered it as formed of short, six-sided, juxtaposed fibres, afterward acknowledged to be cells by Schwann (1838).

‡ The clear zone filled by the enamel extends, always diminishing in thickness, as far as the circular furrow which the bulb and follicular wall form

In proportion as the development of the follicle progresses, the edges of the greyish band, which represents the wall, become more and more distinctly marked, indicating inner and outer surfaces, which are better and better distinguished from the contiguous tissues. The band finally forms a quite resistant envelope, which is completely distinct from the neighbouring parts, and contains only the bulb and organ of the enamel, which is about to appear. The organ of the enamel fills and constitutes the transparent zone, which is interposed between the surface of the bulb and the superior and lateral regions of the follicular wall.

The base of the bulb is at this epoch the largest part, or it is a little less than that portion of the follicle placed immediately above, which is often a little swollen. Consequently, especially in the canines and incisors, it is ovoid at the large extremity, short, almost flat, and turned toward the depth of the tissues. The extremity or base of the follicle is formed by the base of the bulb ; it becomes more narrow than the rest of the organ, at the level of the interior furrow, which results from its continuation with the follicular wall. This constriction becomes quite decided in some species—for example, in the human fœtus at birth, when the bulb seems as if it were provided with a pedicule at the bottom of the follicle. It is this narrower portion which lengthens afterward into the radicular part of the bulb and receives directly the vessels and nerves ; whereas that region of the bulb which is the first to show itself, and which soon covers the organ of the enamel, corresponds to the coronary part or crown of the tooth.

If, at this period, the whole of the follicular apparatus is placed in one preparation in the focus of a microscope, and considerably magnified, we find that the dental bulb is still formed only of nuclei, the most of which are ovid, the others rounded. All of these nuclei are less transparent than the embryo-plastic nuclei ; they are also richer in fine, greyish granulations, and a

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about the base of the follicle by their continuation to this point. Even the slight pressure of the follicle, in distending its wall, not only separates the organ of the enamel from it, but also removes that of the dental bulb. The result is the production of two narrow cavities, separated by the organ of the enamel, which is found as if suspended between them. These cavities are full of the liquid of the preparation, which penetrates by endosmose, and sometimes holds in suspension some anatomic elements detached from the organ of the enamel. Raschkow has, as well as ourselves, observed this fact; but he considers that the cavities are not accidental, and that the liquid is of a lymphatic nature containing colourless corpuscles. But it can be easily seen, when isolated follicles are observed without any pressure of the glass plates, that the follicular wall is naturally very close to the surface of the organ of the ivory, on account of the thinness and membraneous disposition of the organ at that period—whereas the organ deviates from it, under the eye of the observer, when the preparation is compressed.

little smaller. At the time of the appearance of the bulb and at the approaching epoch of its origin, of which we are speaking, these nuclei are very near each other, without being contiguous. A little slightly-granulated amorphous matter is interposed between them: this matter hardly extends beyond the free surface of the bulb; there is none of it at a later period, as we shall see. The follicular wall includes some embryo-plastic nuclei and a little finely-granulated amorphous matter, and also some laminated fibres, in the condition of fusiform bodies as well as completely developed, quite compact, and, consequently, forming a membraneous lamina. No cells can be found as yet on the surface of the bulb, any more than on the deep face of the follicular wall, where the bed of epithelium will soon show itself. We have already said, that from the time of its appearance, this wall contains the capillaries, the meshes of which have a determined shape, and remain nearly the same through all the periods of the fœtal life. They will be described subsequently.

The preceding phenomena, which are connected with the appearance of the follicle, are then followed by new modifications introducing changes which are of three orders. They bear upon the size of the follicle, and upon its form and intimate constitution. The bottom, or that part which is most adherent to the surrounding tissues, always continues convex; while the opposite part, which is directed towards the mucous membrane, seems slightly undulated in the follicles of the incisors, and quite regularly conical in the canines. As for the molars, the internal and external faces of their follicles exhibit several conoid or flattened projections.

It is then readily seen that the projections of the follicle, which are turned toward the gum, reproduce in a general way the shape and number of the projections of the dental bulb itself. This configuration, however, which continues in the bulb, remains perfectly exact in the whole of the follicle only during the time that the wall is not yet in intimate adhesion with the tissue of the mucous membrane. When this adhesion is once ultimately established, it does not allow this envelope to mould itself exactly upon the interior parts of the follicle.

Be that as it may, the general aspect of the follicle, as a whole, bears considerable resemblance to the exterior form of the crown of the future tooth. This depends, as we shall see, upon the fact that the dental bulb represents the mould, as it might be called, upon which is developed the follicular wall, the organ of the enamel, and, in short, the crown first and the root of the tooth afterward. For, as the birth of the dental bulb precedes that of all the constituent parts of the follicle, these parts are successively moulded upon its surface.*

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* It is important to remark that these details can only be observed upon

The process of increase in the size of the follicle is distributed equally through the whole of its mass. Thus, the follicle of the canine, for example, which at the beginning of the development is only from two to six-tenths of a millimetre in breadth, becomes at the moment of the appearance of the dentine two millimetres in breadth; and in the molars, at the same epoch, this width reaches to three and four millimetres.

When the wall has attained a certain distinctness, the follicle of the molars undergoes the following modifications: it is increased considerably in the direction of its length, that is to say, following the axis of the jaw. This enlargement depends upon two causes: first, the increase in the size of the bulb itself; and secondly, the birth of two prolongations upon the sides of the base. Some small papillæ are seen in front and behind the most projecting part of the bulb; these grow vertically, assuming gradually the shape of pyramids or cones, like the primitive middle projection, which remains, moreover, for a long time higher and more voluminous than the others. There are in all animals as many pairs of them as there are pairs of tubercles at the crown. These projections, which are nothing but the reproduction of the principal tubercles of the crown, continue to rise simultaneously while proceeding toward the mucous membrane. They continue invariably separated from each other by a deep furrow. In consequence of this arrangement, the bulb of the molars, in the ulterior periods of evolution, is composed of a single base surmounted by numerous projections, which lengthen more and more, and each of them exhibit individually the form of a cone or pyramid with a sharper and sharper apex; the bulbs then show, in relief, an arrangement of numerous compartments, which will afterward become the pulp cavity, and at the same time the general form of the divisions of the crown.

Among ruminating animals, small lateral projections originate ulteriorly; they are situated nearer the furrow, which forms the junction of the bulb with the wall—these projections will give birth to the lateral tubercles. The follicle of the second false molar appears at a period nearly corresponding, in the rumi-

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fresh pieces isolated from the hard part of the jaw, or still adherent to it, according to the size of the latter organ, and not having yet undergone that flattening which the preservation of the microscopic preparations between two pieces of glass necessitates. The compression of the follicle gives rise, indeed, to different phenomena, which change the relations and form of the parts considerably. The follicular wall is folded upon itself, and, as all the organs slip over each other, the bulb is occasionally separated from the organ of the enamel which touched it, and the latter is also sometimes separated from the follicular wall. The follicle, at the same time, assumes a nearly spheroidal form, and the projections of the wall are entirely obliterated. It is, therefore, always necessary to take these modifications into account in the preparations of the whole of the follicles preserved after a slight compression.

nating animals, to the birth of the organ of the enamel in the follicle of the second large molar; it appears in front of the latter follicle, and the manner of its evolution is exactly similar. This second follicle is followed by that of the second large molar, and then by that of the first false molar. The evolution of each of these follicles reproduces the series of phenomena already described, with modifications in size and form connected with the varieties of form and size of the future teeth.

(To be continued.)

PROCEEDINGS OF DENTAL SOCIETIES.

CENTRAL SOCIETY OF GERMAN DENTISTS.

REPORT OF SECOND ANNUAL MEETING.

(Translated from the Transactions of the Society by Mr G. HENRY, M.C.D.E.)

IN accordance with the announcement which appeared in the third number of the 'Transactions of the Central Society of German Dentists,' the members of the above Society met on the morning of the 6th of August, 1860, in the rooms of the Patriotic Society of Hamburgh.

The meeting was opened at nine a.m. by the President, Dr HEIDER, who warmly welcomed all present, and expressed his gratification at seeing so many of the leading members of the Dental Profession assembled, including the Father of the Central Society, Hr Fricke, of Lüneburg, who was unable to attend the former meeting through illness.

The Secretary, Hr LEHNDORFF, read the report of the first meeting, held at Berlin in August 1859, which was unanimously adopted.

Hr TOPHOR, sen., as Chairman of the Committee, presented a report of the proceedings of the Society during the past year, of which the most important were the establishment of a Journal and the successful formation of the Society, through the unanimous co-operation of the Council and Members of the Committee.

The Treasurer's report of the state of the Society's funds was read and audited, the result being very gratifying.

In reference to the affairs of the Journal, a proposal was made and adopted, that a Committee of Management, consisting of three members, be elected. The choice fell upon Hrn zur Nedden, Kranner, jun., and Jautzen.

The business of the Society was then proceeded with; and it was resolved to grant a diploma of Membership, the style and drawing up of which should be left to the Council and Committee. The Society's seal should bear the inscription, "The Central Society of German Dentists."

Hr ZUR NEDDEN made a proposition with regard to the improvement of the Professional status and the establishment of Dental Schools, which, from its great importance, gave rise to a very animated discussion, and was ultimately deferred until the next annual meeting.

In the afternoon sitting of the 6th of August, Dresden was unanimously appointed for the next place of meeting in 1861, as being more central, and more favourable to a larger assembly of Members of the Profession.

The President, Dr Heider, and Vice-President, Dr Hering, sen., were then re-elected; and Hrn Kranner, jun., and Lehndorff were elected Secretaries for the year 1861.

At the second day's sitting, after a short discussion, it was resolved, "That any Medical gentleman should be allowed to participate in the scientific debates of the Society, on being introduced by an ordinary member, and the admission of non-professionals should be left to the judgment of the office-bearers."

Hr **Kastner** introduced several specimens of forceps and stopping instruments to the notice of the meeting. In order to render German Dentists quite independent of foreign manufacturers, Hr. Krästner had devoted considerable attention to the production of the various Dental requisites, at his extensive laboratories. The instruments exhibited were pointed out as first experiments, and were highly admired for their perfect construction.

Dr **Breithaupt** also exhibited a pair of forceps manufactured in Göttingen, which met with marked approbation.

Hr **Fricke** introduced the subject of teeth becoming reddened in rheumatic affections, and hoped the Members would turn their attention to this interesting subject. He also exhibited a large collection of teeth and stumps which were thus reddened.

In the discussion which followed, Hr **zur Nedden** observed that the colouring proceeded from the pulp of the tooth, and had its origin in diseased conditions of the same.

Hr **Weber** remarked, that on removing the fangs of a double tooth from which the crown had been broken a few hours previously, they were deeply coloured; and he was of opinion that in this case the colouring matter had permeated the exterior of the tooth.

Hr **Elias** had discovered the discolouration after the use of the well-known arsenic paste, and believed that in all cases severe inflammation preceded the infiltration: with which opinion Hr **Wunder** coincided.

Dr **Heider** agreed with Hr zur Nedden that the colouring most probably proceeded from the tooth-pulp, and showed that as long as research failed in determining this question, we cannot gainsay that infiltration may take place through the cementum of a tooth. He also referred to the reddening of teeth in persons who had died of cholera, and in all cases of death from suffocation; and mentioned the case of an Italian family in whom both the deciduous and permanent teeth were of a beautiful rose colour after eruption, which only gradually paled off, without ever entirely disappearing.

M. **Grandhomme** mentioned a case where the red appearance presented itself in a child after the use of sea-salt baths; and Hr **Elias** had known it result from the irritation produced by a filling.

Dr **Ernst Tophor**, jun., read a paper "On a Case of Prosopalgia arising through Exostosis, and its Cure." Hr Tophor succeeded in curing the above neuralgic affection, which was of two years' duration, by the extraction of three apparently sound upper molars of the right side, which on examination showed a great thickening of the cementum, and also osseous deposit on the parietes of the pulp cavity.

Hr **Weber** exhibited a beautiful vulcanite obturator which had been worn with the best results. It had been constructed in a prepared rubber, which from its softness and elasticity had a great resemblance to the soft gums.

Hr **Brock** exhibited specimens of leaf and sponge gold as prepared by Hr Schätzler of Närnberg, and strongly recommended it to the notice of the Members.

On the morning of the 8th of August, the Members reassembled, when the ballot took place for Ordinary and Corresponding Members. The following gentlemen were elected :—

Ordinary Members.—The Hrn Dr Bruck of Breslau, G. Meyer of Kempten, and Dr Steinberger of Vienna.

Corresponding Members.—The Hrn Dr Albrecht and Dr Böhm of Berlin, Dr Cohen and Dr Klenke of Hanover, Th. Evans and M. Weber of Paris; Messrs Robinson, Saunders, and Tomes, of London; Dr Strempel of Rostock, and Mr James Murphy of Petersburgh

The business of the Society being concluded, the reading and discussion of scientific subjects was continued.

Hr **Holsten** exhibited his new apparatus for packing vulcanite in a liquid state, and gave a minute description of his method of proceeding; in which the principal advantage gained appeared to be in the saving of time and labour. He also exhibited specimens of platina in sheet and wire from the depôt of Holsten and Struve.

Dr **Hering**, sen., read a paper* "On the best Method of pivoting Teeth, and of removing Metal Pins from Roots with ease and safety."

Hr Dr **Kranner**, jun., drew attention to the importance of keeping the original model when working in vulcanite, and described a plan he had adopted for securing fac-similes; which consisted in procuring an impression of the original in very thick fluid glue, from which exact plaster models could be taken at pleasure. The advantage of the glue-mould is its elasticity, which allows the plaster cast to be easily removed without the slighest injury to it, and it can be preserved for a long period. Dr Kranner also spoke of a mixture of pearl-wax (paraffin) and white-wax, for modelling.

Hr **Schultz** exhibited several vulcanite cases with coloured gums, the latter made from Diffenbach's amber-mass, and from a mixture of amber with pink vulcanite, also a mixture of pink vulcanite and gold rubber. He observed with regard to the mixture of amber with pink vulcanite, that the brittleness of the amber-mass was thereby considerably increased.

Hr **Suersen** directed the attention of the Members to phosphorus' dissolved in oil as a cure for tooth-ache in the early stage of periostitis.

Hr **Tophor**, sen., exhibited a very simple contrivance for making spiral springs.

The scientific business of the Society being herewith concluded, a vote of thanks was unanimously accorded to the Treasurer, Hr Schultz, for the careful and accurate manner in which he had kept the accounts of the Society. Hr Fricke and Hr zur Nedden were then elected Members of Committee. It was arranged that the next annual meeting should be deferred until the latter end of August 1861. With this the meeting terminated.

In the afternoon of the 8th August, the Members reassembled to confer with reference to the operation of stopping with gold. The relative value of the preparations of leaf, sponge, and crystal gold was fully discussed; besides which, the method of stopping with each material was demonstrated by several of the Members.

Dr **Heider** exhibited a very large specimen of salivary calculus, also a dental anomaly consisting of an enormous development of dentine and cementum attached to the side of a wisdom tooth, being nearly double the size of the tooth itself.

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* This and all the papers alluded to in the Report are given in full in the Central Society's Journal, from which we hope to make occasional selections from its many original and valuable communications.

Several books and specimens were contributed to the Society's collection; and after the reading and adoption of the minutes of the meetings, the present one was closed by the President, to whom a cordial vote of thanks was unanimously accorded.

[The Report concludes by congratulating the Members on the scientific nature of the proceedings generally, and the excellent attendance at the several meetings, all tending to further the praiseworthy object of the Society—to elevate the Professional status, and to give the Central Society of German Dentists a substantial existence.—G. H.]

COLLEGE OF DENTISTS OF ENGLAND.

Election of Members.—At a Meeting of the Council of this College, held on the evening of Tuesday, July 9th, Mr John H. B. Thwaites, of Park street, Bristol, was readmitted a Member of the College; and on the evening of Tuesday, July 23rd, Messrs Charles J. A. and W. J. Usher, of Upper Baker street, Pegent's park, were elected Associates of the College.

Meetings of Examiners.—At a Special Meeting of the Board of Examiners, held on Wednesday, July 17th, Mr Thomas Cooke Parson, of Orchard street Bristol, was admitted a Member of the College by Examination.

Mr John W. Wood, of Carlisle House, Brighton, Associate, having passed the necessary examination, was admitted a Member of the College on the 31st of July.

CORRESPONDENCE.

THE 'LANCET' AND THE COLLEGE OF DENTISTS.

The Secretary of the College of Dentists of England presents his compliments to the Editor of the Dental Review, and will feel obliged by the insertion of the accompanying copy of an article which appeared in the 'Lancet' of the 20th inst., and of the reply thereto, which has been forwarded to that journal for publication.

5 Cavendish square, July 30, 1861.

THE COLLEGE OF DENTISTS.

The Council of the so-called "College of Dentists of England" lately requested the insertion in our columns of a statement in reply to the charges—that they had no right to that title, since they represented only a section, and that the less respectable, of the Dental Profession of England; that they encumbered the progress of the Dental Profession by assuming to give diplomas in the presence of a well-constituted governmental body specially appointed by charter for that purpose; and that they dishonoured the name of "College" by profusely decorating with the collegiate title men who have persistently degraded the Dental Profession by touting advertisements of an objectionable kind. To these charges the Council have delivered a very solemn and deliberate reply;

they have made, with great affectation of ingenuous candour, statements in defence which it has been our duty to analyse; and if we show that they are wholly and inconceivably without foundation, this institution will cease to be ranked amongst those which can be tolerated or recognised in an honourable profession.

First, we observed that this institution—self-constituted and self-styled "a College"—had no claim to that title; that its constitution was shifting and susceptible of any abuse, regulated only by its own will, and capable of being perverted, by the unscrupulous, to others' own uses; and that it was without a charter. The Council state: "We are in every particular constituted as many other Colleges—such, for instance, as the College of Preceptors, the Agricultural College, and the College of Civil Engineers." This seems to be a very satisfactory answer; so it would be if there were a grain of truth in it. We are reluctantly compelled, however, to state that the Royal College of Preceptors we find to have been "incorporated by Royal Charter, March, 1849;" the Royal Agricultural College to have been "incorporated by Charter, granted by her Majesty in Council, March 27th, 1845;" the Institution of Civil Engineers—the College of Civil Engineers has long ceased to exist—to have been incorporated by Royal Charter in 1828. This may be thought to be well-nigh incredible, but such are the facts.

So much for the answer to the first part of the charge. To the second part the Council replied that their rules forbade unprofessional advertising, and that they were careful to exclude Dentists who placarded themselves. We have, then, to announce, as the result of an analysis of the recently-published list of 135 names, that 30 are associated with touting. We will select some choice specimens:

One member of the College, of the family of Moseley,—of whom three are members,—elected in 1856, advertises habitually now, as for years: "Teeth by her Majesty's royal letters patent; newly-invented and *patented* application of the terreous artificial teeth, without wires or fastenings." In the course of half a column of fustian, he speaks of "Decayed and tender teeth permanently restored to use, preventing the necessity of extraction." Looking to the practice of the member whose name stands next in the list of this College, Mr Neep, we find that in the 'Norfolk News,' of January, 1861, he describes himself as a certificated member of the College of Dentists of England, and "respectfully announces that he continues to supply artificial teeth upon the most scientific principles, which are guaranteed to answer every purpose for mastication, beauty, comfort, and durability not be surpassed," &c. A third member, Mr Dagnall, recently informed the "Gentry of Hampton," by printed circular, decorated with the Royal Arms, that he was a M.C.D.E., that he possessed a "new and important discovery," and that "persons were waited on at their residences without extra charge." How much further are we to go? Must we quote the puffs of the gentlemen who announce in the 'Western-super-Mare Gazette,' that they "are able to fit plates to the stumps without the amount of irritation usually produced;" and who also "attend persons at their own residences without a fee"? Shall we mention Mr Wotton, also a M.C.D.E., who startles the public of Cornwall and Devon by proclaiming "Teeth protected by Royal letters patent;" "the teeth with coral India gums by patent machinery;" and whose "patented coral India gums must be seen to be admired," &c.? None of the above members were admitted by *examination*, but on the ground of their claims by standing and respectability.

We repeat, then, that there are thirty names of persons whom we know to be touting Dentists in the list of the members. The above are extracts from a few of their advertisements. The Council say that they have "rules" upon the subject, on which they act. Then, if these do not contradict their rules, they are even less worthy of professional regard than we have ventured to think. If they do, the conduct of the Council in admitting men known to be guilty of such puffs, in spite of their regulations, is treasonable to those who joined them on the faith of their rules, and must deprive them of any claim to confidence. At any rate, the Council stand convicted of boldly denying the patent truths which we asserted, and of deliberately alleging false statements in their defence.

Let us dismiss this part of the question. If the Council had conducted otherwise the affairs of this establishment, it would still have been a mischievous superfluity. The College of Surgeons has provided an organisation for examining Dentists, in response to the repeated appeals of the most eminent Dentists of the country. One hundred and thirty-one of the most distinguished members of the Dental Profession have passed that examination, and amongst them twelve out of the seventeen Dentists to metropolitan hospitals, four having declined to join any organisation whatever. There is an excellent hospital and school, numbering most of the distinguished names amongst its professors; and we have necessarily the assurance that whatever is done under the Royal Charter granted to the College of Surgeons will be done in accordance with its provisions, and in conformity with the known rules of professional conduct. With the self-constituted College of Dentists there is no security whatever: at any moment it may start into new abuses, and the more rapidly as the respectable members fall away in disgust. We may observe, *par parenthèse*, that in their last printed list we find recorded the names of eleven gentlemen who have practically seceded by obtaining the dental diploma of the College of Surgeons. The certificate which has been degraded by being habitually paraded in puffs such as we have quoted is not likely to be the object of a legitimate ambition. As this institution fails in respectability, it is likely to grow in desperation; and from its extraordinary constitution we have no security that it may not give further encouragement to touting pretenders.

TO THE EDITOR OF THE 'LANCET.'

Sir,—I regret again to have to ask you to allow me a few lines of reply to your last annotation on the proceedings of the College of Dentists.

In the first place, I have to complain that you misinterpreted the meaning of the observation made in my previous letter, that "we (the College of Dentists) are in every particular constituted as many other Colleges." It were, of course, easy to put your construction on this statement, and to draw from it the assumption that the Council of the College claimed to be a chartered body. But in reality there was no such intention conveyed in the terms used. My simple and easily-understood meaning was, that the College of Dentists was constituted—that is to say, brought together or established—as were the Colleges named. The fact that one of these Colleges has ceased to exist, and that the others after their institution obtained charters of incorporation, has nothing to do with the question, inasmuch as the obtaining of a charter did not alter their constitution, but only confirmed it. I might perhaps have used the word "instituted" for "constituted;" but it did not occur to me for a moment that the construction you have given to my words could have possibly been applied, seeing that it was universally known that the College of Dentists did not possess a charter.

In the second place, you charge the Council with having in the list of Members certain advertising persons, four of whom you mention by name. The answer to this charge is comprised in the simple fact that these four gentlemen were not brought into the College by the present Council, but were admitted by the very persons who are now so strongly opposed to us; a circumstance which no doubt enabled them so readily to furnish you with the names of those who are advertising in a manner contrary to the laws of the College, and which the Council themselves were not aware of.

These four names were placed on the College list during the first and second years of its establishment, at a time when not more than seven members of the present Council formed part of the executive of the College. By reference to the records of the College, I find that in December 1856, a Committee of Scrutiny was appointed to revise the list of Members, and finally to decide who were fit and proper persons to be retained, and who should be rejected. This Committee returned in their list of the gentlemen who were eligible for membership the names of Dagnall and Wotton, and did not exclude those of Neep or Moseley, who were already on the roll, and whose names remained on the College list when the Members of the Council to whom I have referred resigned in 1858, nearly twelve months after the report was made by their own Scrutiny Committee, and during which time they continued to receive the subscriptions and recognise as Members of the College the four gentlemen whom they now hold up to professional condemnation.

I cannot help thinking that it says much for the proceedings of the present Council, that the enemies of the College, when endeavouring to place it before the public in the worst possible light, could not select, out of a list of 167 names, any other than the four which they themselves left as a legacy to their successors, and who remain rather as evidence of their own neglect and culpability, than of any desire on the part of the present Council to countenance such advertisements as these gentlemen are charged with issuing.

Feeling, Sir, that with us, as with every other public body, there are always errors to be corrected, we shall be glad to have them pointed out, whether by friends or enemies, and in so far as we are able will endeavour to correct them. But let our adversaries be assured that we shall not allow ourselves to be crushed by insult, nor shall we cease doing what we believe to be a useful work by the mere intimation of a section of opposing Dentists (not more numerous than ourselves) that we must subside to their dictation. If we are comparatively small as a body, such is our unitedness that our means have always been in advance of our necessities. We are steadily increasing in numbers; the younger members of our Profession are coming to us eagerly for instruction and alliance; the Medical Profession has strongly backed us when we have appealed to it, and altogether we have every reason to be satisfied with our success. Further, we have a principle in view: we are anxious to be on terms with the Medical Profession, but not to constitute a subsection of it. We believe we are distinct as a profession, and should stand as separate for the advantage of your profession, our own, and for the public.

I have the honour to be, Sir, your obedient servant,

George Waite, M.R.C.S., President.

College of Dentists,
5 Cavendish square, July 29th, 1861.

MISCELLANEOUS.

Dental Appointment. — Mr John H. B. Thwaites, Member of the College of Dentists of England, has been appointed Dentist to the Bristol General Hospital.

Cyanide of Potassium in Soldering Metals. By Dr August Vogel.—In the operation of soldering metals, it is very essential to keep the metallic surfaces to be united clean and bright, so that the solder may adhere firmly when in a melted condition. For the purpose of protecting the metallic surfaces from the oxidizing action of the atmosphere, certain fusible substances are usually rubbed on with the solder, and immediately form a thin layer over the surface of the metal. These substances produce, however, not only a protective, but also a reducing action. In practice it is sought to insure these two essential conditions in the choice of the substances generally employed, viz., for soft soldering, resin, turpentine, olive oil, powdered sal-ammoniac, mixed either with oil, or with tallow and resin, or a very concentrated solution of chloride of zinc. For hard soldering borax, or a melted mixture prepared from borax, potash, and common salt, and, in the special case of iron, pounded green glass is generally used. It is well known that the substances above mentioned fulfil to a greater or less extent these two conditions of soldering, viz., deoxidization and protection of the metal from the atmosphere. A material possessing these two qualifications in the highest degree would, of course, best effect this purpose. As the result of a great number of experiments, I have come to the conclusion that the ordinary commercial quality of cyanide of potassium possesses decided advantages in this respect over all other substances. It melts very readily, covering the surface of the metal with a very efficient protective layer, and at the same time is known to exert a strong reducing action—a property which has gained for it many important applications both in technical and analytical chemistry. Cyanide of potassium will be found particularly useful when the surfaces to be soldered cannot be thoroughly brightened. It is difficult, and sometimes impossible, to solder metals when their surfaces are at all corroded, or when they are incapable of bearing the high temperature necessary in this operation, with the ordinary agents, on account of their inferior reducing power; but cyanide of potassium, from its extraordinarily energetic action, is able to deoxidize all rusty particles standing in the way of the perfect union of the solder with the metal. The mode of applying the cyanide of potassium in soldering is the same as with borax. Some powdered cyanide of potassium is kept ready at hand in a well-closed glass bottle, and sprinkled over the metallic surface after it has been slightly moistened. In some cases of soldering at very high temperatures, which, by practice, are soon ascertained, it will be found expedient to use a compound of borax and cyanide of potassium, for the purpose, on the one hand, of increasing, by this addition, the small reducing power of the borax, and, on the other hand, of diminishing the volatilizing tendency of the cyanide of potassium. Another reason for preferring the employment of this agent is, that during the operation no corrosive vapours capable of acting on the soldering tools are generated, as is the case with chloride of zinc.—'Chemical News.'

Sacrificial Metals.—A curious statement made in the House of Commons, a few days ago, induces us to offer a few remarks on what may be called, appropriately enough, "the sacrificial function in metals." It was stated, our readers will remember, that the leaden envelope with which the Armstrong shell is surrounded, and which is absolutely necessary as a constituent part of that missile, might be caused to adhere securely, either by "a sort of mortise," or by the intermediation of zinc. The second expedient is that indeed adopted; with what amount of success, the recent practice of these guns in China would disclose, were the Government not so pertinaciously bent on holding back the communications which have reached them on this matter. It is a fact perfectly well known to chemists, but one which mechanicians have not heeded nearly so much as it deserves, that when two metals are retained in contact, and conjointly exposed to chemical influences during long periods of time, one metal sacrifices itself to insure the other's preservation. The history of mechanical construction furnishes numerous illustrations of this chemical fact, as will be presently seen, when we come to cite a few examples; the marvel, then, is that Sir William Armstrong—or, rather, the laboratory branch of the War Department, before whose cognizance the proposition of zinc soldering (thus to designate it) must have come—could ever have sanctioned an expedient which must necessarily fail in the end, like every other expedient which violates a law of Nature. The history of ships' copper sheathing shall be taken as our first illustration of the sacrificial metallic function. Sir Humphrey Davy, as is well known, devised a method of checking or altogether obviating the destruction of ships' copper sheathing. He accomplished this by attaching to the ship's bottom, at suitable intervals, slabs of the metal zinc, and which he called protectors. Protectors they were, in the following manner: The zinc rapidly corroded, and was lost; but, so long as any zinc remained for the sea-water to act upon, the copper remained untouched. So far as copper preservation is concerned, the method adopted must be pronounced efficient. Practically, it failed, indeed, to secure the advantages described, but not for any reason that concerns us here. It was found that when copper no longer slowly dissolved, it ceased to be a poisonous metal. Barnacles and seaweed attached themselves, just as they might have done to an uncoppered wooden bottom; and, moreover, owing to a galvanic action set up, the ship's copper was rapidly fouled by a deposition of magnesia and lime, precipitated from the magnesian and calcareous soluble salts always present in sea-water. Failing, then, to achieve what was intended of it, the copper-protecting process of Davy ceased to be employed; but the failure of it is that which alone concerns us here, as illustrating what we would wish to convey by the words "sacrificial metal." Take, as the next example, the illustration afforded by the setting of an iron paling-rail in a bed of lead. The most casual observation, as one passes along the streets of this city, may be made more pregnant with fact bearing upon this matter than the longest homily. For a time, varying as to length with locality, external influences, and—perhaps, in some degree—on the varying quality of the iron and lead brought into contact, both metals remain sound. But, after a time, decay inevitably sets in, and, when once commenced, marches to the issue of final destruction with wonderful rapidity. The remarkable fact is, that both metals do not decay simultaneously; it is the iron which corrodes, while lead—the softer metal—remains intact. Let the mechanician do what he will, this result cannot be prevented—a law of nature having decreed the sacrifice, it must and will be achieved. Our next illustration shall be ordinary tin plate—iron, coated with tin, as is well known. Well, what sort of destruction is set up when tin plate has been exposed for a long duration of time to the atmosphere? Is the tin destroyed—does it tarnish even? Never. Iron is the sacrificial metal here; and, as surely as the iron is anywhere exposed, it perishes, crumbles, and dissolves away with destructive rapidity. The rate of destruction of iron totally unprotected is slow, by comparison with that which ensues when, owing to a flaw or disintegration of the covering tin envelope, atmospheric agencies come into play upon the underlying metal. But the case we most particularly wish to direct attention to, is the result of bringing zinc into contact with iron, and retaining the two metals together over long periods, as may be seen in the so-called galvanised iron. Under this latter disposition, zinc becomes the sacrificial metal. Not one particle of iron decays, so long as atmospheric destructive agents can wreak their dissolution—so to speak—on the protective zinc. Nor does this protection altogether depend on a complete covering of the iron. Flaws and imperfections there are, and necessarily must be, through which, quite down to the iron, destructive agents, always present in the atmosphere, must penetrate. They do not act upon the iron, nevertheless, so long as a sufficient expanse of protective zinc surface remains; and this simply because a fundamental law of Nature forbids their doing so.—'Mechanics' Magazine,' and 'Chemical News.'

Liabilities to Dentists.—Lee *v.* Griffin.—This was an action in which the plaintiff, a Surgeon-Dentist in Moorfields, sued the administrator of a Mrs Penson, to recover the sum of twenty guineas, as the price of two sets of teeth made for the deceased lady upon her order. At the trial, which took place some time since before Mr Justice Crompton, the plaintiff stated that he received a verbal order from the deceased lady to make her two sets of teeth ; and he took a model of her mouth, and some time after he wrote to her, and asked her to make an appointment for an early day, as the teeth which she had ordered were ready for her. He also produced a letter which he said he had received in answer, in which, after merely thanking him for his kindness, the deceased lady said, "My health will prevent my taking advantage of the early day." The old lady died some time after, before the goods were delivered; and when the account was sent in to the defendant, he disputed his liability. Mr Justice Crompton expressed his opinion that this was not a sufficient memorandum in writing within the Statute of Frauds, and was about to nonsuit the plaintiff, when the plaintiff's counsel suggested that the plaintiff might recover under the count for work and labour and materials. The verdict was then entered for the plaintiff for twenty guineas, and the defendant had leave to move. A rule having been accordingly granted, Mr Patchett now showed cause, and contended, on the authority of "Clay *v.* Yates" (1 H. and N., 73), that when the skill of the artist was the chief ingredient in the value of the article, he could recover for his work, labour, and materials. He also contended that the letter of the deceased referring to the plaintiff's letter (the contents of which were proved by parol) together made up a contract in writing within the Statute of Frauds. Mr J. O. Griffiths, who appeared in support of the rule, was not called upon. Mr Justice Crompton said, he was of opinion that the rule ought to be made absolute. There was no pretence of saying that there was any contract in writing within the Statute of Frauds; and, independently of that (as had been observed by Mr Justice Hill), it was difficult to see what course of action the plaintiff could have had, seeing that the contract was that the teeth were to be fitted to the lady's mouth, which they never had been. A question was raised at the trial, whether this was a contract for work and labour and materials, or for a chattel to be sold and delivered. His lordship thought it was the latter, and as there was no contract, in writing, within the Statute of Frauds, the plaintiff ought to have been nonsuited. Mr Justice Hill and Mr Justice Blackburn were of the same opinion.—Rule absolute to enter a nonsuit.

NOTICES TO READERS AND CORRESPONDENTS.

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BOOKS RECEIVED IN EXCHANGE.

The Dental Cosmos for July.
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Pharmaceutical Journal for July.

THE
DENTAL REVIEW.

SEPTEMBER, 1861.

THE NATURAL HISTORY OF THE HUMAN TEETH.

By JOHN HUNTER, F.R.S.

EDITED BY
FRANCIS C. WEBB, M.D. Edin., F.L.S., F.S.A.,
Member of the Royal College of Physicians of London; Physician to the Great

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ERRATUM.—"HUNTER ON THE TEETH."

The following note by the Author should have preceded the Editor's note in the August number, page 341:

* It is here to be understood, that the Teeth from which we take our description, are such as are just completely formed, and therefore not in the least worn down by mastication. Our description of each class is taken from the Lower-Jaw; and the difference between them, and their corresponding classes in the Upper immediately follows that description.

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the Sloths or Tardigrades; and amongst the Insectivorous *Bruta*, in the Cape Ant-eater (*Orycteropus Capensis*), and in the Great Armadillo (*Priodon gigas*). In the Armadillos of the sub-genus *Euphractus*, however, a single tooth which resembles the succeeding molars is implanted in the premaxillary bone; and in the lower jaw the two anterior teeth being in advance of the premaxillary tooth, are also to be considered incisors. A portion of the lower jaw of the great extinct Armadillo (*Glyptodon*) shows that the teeth extend close to the symphysis, a corresponding implantation in the premaxillaries above being thereby indicated.

The premaxillary bones are generally toothless in the true *Cetacea*: the

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(1) In compiling the information contained in the above and following notes on the Comparative Anatomy of the Teeth in Mammalia, the Editor has been chiefly indebted to the writings of Prof. Owen, F.R.S., especially the article 'Odontology,' in the last edition of the 'Encyclopædia Britannica.'

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Member of the Royal College of Physicians of London; Physician to the Great Northern Hospital, &c.

(Continued from page 341.)

OF THE INCISORES.

The *Incisores* are situated in the anterior part of the Jaw; (*d*) the others more backwards on each side, in the order in which we have named them. The bodies of the *Incisores* are broad, having two flat surfaces, one anterior, the other posterior. These surfaces meet in a sharp cutting edge. The anterior surface is convex in every direction, and placed almost perpendicularly; and the posterior is concave and sloping, so that the cutting edge is almost directly over the anterior surface.

(*d*) It has been already stated that in scientific nomenclature the term incisor is restricted to those teeth which are implanted in the premaxillary bones, and in the corresponding part of the lower jaw. In the Mammalian series, (1) if we commence with the order *Bruta*, we find many instances of the total absence of teeth thus implanted. This is the case in the Phyllophagous *Bruta*—the Sloths or Tardigrades; and amongst the Insectivorous *Bruta*, in the Cape Ant-eater (*Orycteropus Capensis*), and in the Great Armadillo (*Priodon gigas*). In the Armadillos of the sub-genus *Euphractus*, however, a single tooth which resembles the succeeding molars is implanted in the premaxillary bone; and in the lower jaw the two anterior teeth being in advance of the premaxillary tooth, are also to be considered incisors. A portion of the lower jaw of the great extinct Armadillo (*Glyptodon*) shows that the teeth extend close to the symphysis, a corresponding implantation in the premaxillaries above being thereby indicated.

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These surfaces are broadest and the Tooth is thinnest at the cutting edge, or end of the Tooth, and thence they become gradually narrower and the Tooth thicker towards the neck,

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Dolphin, however, is an exception, one pair of its numerous teeth being premaxillary. The Narwhal (*Monodon monoceros*) may be also considered another exceptional instance. In the female Narwhal, a tusk is concealed in each premaxillary bone at its junction with the maxillary, but remains throughout life an abortive germ; in the male, the tooth on the left side continues to grow, and is developed into the so-called "horn," acquiring a length of nine or ten feet.

In common with many *Bruta*, the Carnivorous *Cetacea* exhibit an inferiority in their dental system not only in the acquisition of but a single set, but in the uniformity of shape which characterises the dental organs ; but on turning to the Aquatic Pachyderms, designated by Cuvier *Herbivorous Cetacea*, we find a higher type of dentition attained. The Dugong (*Halicore*) has incisors distinguished both by shape and position from the molars ; in the upper jaw are two deciduous incisive tusks which are displaced vertically and succeeded by permanent tusks. It is, however, in the male sex and in the upper jaw only that these teeth project from the gum ; in the female Dugong both upper and lower incisors remain concealed throughout life. The superior incisors are two in number in both sexes ; in the male the extremity only of the tusk projects from the jaw, at least seven-eighths of its extent being lodged in the socket. The male tusk is subtriedral, moderately and equally curved, and its extremity is bevelled off to a cutting edge like the scalpriform incisors of the Rodents. In the young American Manatee (*Manatus americanus*) each premaxillary bone supports a deciduous tusk, which, however, is not replaced. In the gum which covers the deflected portion of the ramus of the lower jaw in the new-born Manatee, six rudimentary impressions for teeth are to be observed; in one of these an incisor tooth was observed by Stannius.

Incisors are present in all the species of the order *Marsupialia*, but they vary in number, in some instances exceeding that of the Mammalian type. In the carnivorous dog-headed Thylacine and Ursine Dasyure, there are eight incisors in the upper jaw, and six in the lower ; in the Dasyures these teeth are simple in structure, and are arranged in a regular semicircle. The existing Australian genus *Myrmecobius*, and the extinct Marsupial genera *Phascolotherium* and *Amphitherium*, found in the oolitic slate at Stonesfield in Oxfordshire, afford examples in which the incisors are separated from each other and from the canines by vacant spaces. Ten incisor teeth in the upper jaw and eight in the lower are found in the Opossums (*Didelphys*); the two middle upper incisors are longer than the others, from which they are separated by a short interspace. In the Tapoa (*Phalangista fuliginosa*), the Koala (*Phascolarctos cinereus*), the Kangaroo Rats (*Hypsiprymnus*), and the Kangaroos (*Macropus*), there are six incisors in the upper jaw, whilst the lower are reduced to two. The two anterior upper incisors are more than twice as large as the lateral in the Koala; the same teeth also attain large dimensions as compared with the others of the series in the Kangaroo Rats : in the latter genus their pulps are persistent. The feeble development of the lateral superior incisors in *Phascolarctos* and *Hypsiprymnus* is succeeded by their total suppression in the Marsupial Rodent, the Wombat. In the Wombat (*Phascolomys*), the incisors are two in the upper and two in the lower jaw ; they are genuine *dentes* where the surfaces are continued to the narrowest side, or edge of the fang. The body of an *Incisor*, in a side-view, grows gradually thicker, or broader, from the edge or end of the

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scalprarii with persistent pulps, although inferior, especially in the lower jaw, in length and curvature to those of the true Rodents. A transition between the dentition of the Kangaroos and the Wombat is presented by a gigantic extinct Australian herbivorous Marsupial, the Diprotodon. In this species the general dentition approached that of the Kangaroo; but the median upper incisors were large curved scalpriform tusks which worked against a pair of procumbent tusks below.

In the different species of the order *Insectivora*, the incisors differ in number and size: in some genera they approximate more or less to the scalpriform teeth of the Rodents. In the Cape Mole (*Chrysochloris Capensis*), the Shrew Moles of America (*Scalops*), in the *Solenodon paradoxus* of Hayti, there are three incisors in each premaxillary, and the median one is of large size. In *Scalops* this tooth is scalpriform, in *Chrysochloris* and *Solenodon* laniariform. In the lower jaw the anterior incisor in these genera is of small size and procumbent, whilst the second incisor is large and laniariform: a third lower incisor of small size is present in *Chrysochloris* and *Solenodon*, but is absent in *Scalops*. The incisor teeth in the European Mole (*Talpa*) are six in number in each jaw, small, and simple in conformation; the fourth tooth on each side below, although resembling the incisors in shape, is to be considered a canine—its crown passing in front of the upper canine when the mouth is shut. The typical Shrews (*Soricidæ*) manifest their analogy to the Rodents by the great preponderance in size of the first two incisors in both jaws, and the sub-genera of Shrews are partly founded on variations in the shape of these teeth. In the European Hedgehog (*Erinaceus Europeus*) these teeth are six in each jaw, the anterior pair both above and below being larger and longer than the rest and very deeply implanted. The number is reduced to; four in each mandible in the Tropical Hedgehogs *Echinops* and *Ericulus;* in the Tenrecs or Tailless Hedgehogs of Madagascar (*Centetes*) there are four small incisors above, whilst the typical number six is retained below.

The incisors in *Cheiroptera* may be entirely wanting or present in the numbers 1. 1. to 2. 2. in the upper jaw, and 1. 1. to 3. 3. in the lower; they are always very small, and in the upper jaw unequal and separated by a median interval. In the Suctorial or Vampire Bats (*Desmodus*) the anterior teeth are modified in accordance with their habits. The upper incisors are two in number, one in each premaxillary bone, closely approximated, with a very large compressed curved and sharp-pointed crown, implanted by a strong fang which extends beyond the premaxillary into the maxillary bone. They are succeeded by similarly-formed canines. In the lower jaw, the incisors, two in number on each side, are much smaller than in the upper, and have bilobed crowns. In the Colugos (*Galeopithecus*), which in their general organisation approach the Lemurs, although placed by Cuvier at the end of the Bats, we find two incisors in the upper jaw on each side, of which the two anterior are separated by a wide interval; in the Philippine Colugos they have a bilobed crown. In *Galeopithecus Temminckii* the crown is an expanded plate with three or four tubercles; the second upper incisor

Tooth to its neck; and these coincide with the flat, or broad side of the fang; so that when we look on the fore part, or on the back part of an *Incisor*, we observe it grows constantly

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in both species is implanted by two fangs. The lower incisors are three in number on each side. The crowns of the first two present the form of a comb,—a configuration which, unique in Mammalia, depends upon the prolongation of notches deeper and more numerous, but yet analogous to the indentations on the cutting edge of the newly-formed human incisor.

In the extensive order of Rodents, we find the incisors represented by a large curved ever-growing pair of teeth in each jaw, which are separated by a wide interval from the short molar series. To this there is but one exception—the family of the *Leporidæ*, Hares, Rabbits, and Picas, in which a minute second incisor occurs on each side behind the large upper scalpriform tooth. The upper incisors describe a larger segment of a smaller circle; the lower, a smaller segment of a larger circle: the lower are the larger teeth, and their sockets extend to the back part of the jaw on the inner side of the molars. These teeth are of unlimited growth; and if by accident the opposing teeth are lost, they continue to grow until they describe a complete circle, perforating the skin, and causing absorption of the bone with which they come in contact. Throughout life the base of the tooth continues widely open, and contains a long conical persistent pulp, which is surrounded by a progressively ossifying capsule. Near the crown an enamel-pulp is attached to the inner side of that part of the capsule which covers the convex surface of the curved incisor. The tooth consists of a body of dentine with a plate of enamel on its anterior surface, and a general investment of cement, which is, however, very thin upon the enamel. The mutual action of the lower and upper incisors produces an obliquely worn surface on the extremity of the crown, which slopes backwards from the anterior edge of hard enamel: the resemblance so produced to the cutting edge of a chisel has given the name of "*dentes scalprarii*" to these teeth. The varieties the scalpriform incisors present in the different species of Rodents are limited to their size, and the colour and sculpturing of their anterior surface. In the Coypu, Beaver, Agouti, and some other species, the enamelled surface is of an orange or brownish-red colour. In some genera the same surface presents a longitudinal groove.

On turning to the order *Quadrumana*, we find a genus (*Cheiromys*) in which, as in the Marsupial Wombat, the Suctorial Bats, and the Insectivorous Shrews, the dentition is modified in analogy with the Rodent Type. In the Aye-aye (*Chieromys Madagascariensis*) canines are wanting, and a wide interval separates two large curved scalpriform incisors from the molar series. These teeth differ from the incisors of the Rodents in having an entire investment of enamel, which is, however, thickest on the anterior surface. In the slow Lemurs (*Stenops*), and in the true Lemurs, or Makis, there are four incisor teeth in each jaw. In *Stenops* the first upper incisor is larger than the second: in the true Lemurs the upper incisors are small and vertical, with expanded crowns; an interval separating the two on the right side from those on the left. The inferior incisors with the canine are long, narrow, compressed, and procumbent. In the Platyrhine Quadrumanes of narrower from its cutting edge to the extremity of its fang. But in a side-view it is thickest or broadest at its neck, and thence becomes gradually more narrow, both to its cutting edge, and to the point of its fang.

America, as in the Quadrumana of the Old World, the incisors are $\frac{2}{2}$: $\frac{2}{2}$: ; the Sakis manifest the lemurine character of long narrow inferior incisors. In *Cebus* the inferior incisive teeth have broad, thick, wedge-shaped incisive crowns; and this character is generally retained throughout the Quadrumanous series. The *Simiæ* of the Old World present the nearest approach to human conformation offered by the animal kingdom. The large black tailless Apes of Africa (*Troglodytes*), and the red Orangs of the Indian Archipelago (*Pithecus*), afford the closest approximation. It will be interesting here to compare this part of the dental series in the two best-known African species—the Gorilla and Chimpanzee, and in the two species of Orang, with the human permanent incisors.

The characteristics of the human incisors are their smallness of size in proportion to the other teeth and to the entire skull; their near equality of size with each other; their thin wedge-like form, and their vertical, or nearly vertical, implantation. In the upper jaw the two middle incisors slightly exceed the lateral in breadth; the posterior surfaces of both are smooth and slightly concave. The middle incisor presents a slightly-developed basal ridge on its posterior surface; but such elevation is entirely absent on the posterior surface of the lateral one. The external angle of the crown of the lateral incisor is not rounded off, and is in contact with the canine. In the lower jaw the incisors are somewhat smaller than in the upper, and the breadth of the central is slightly inferior to that of the lateral; the outer angle of the crown of the latter is entire. In the Gorilla and Chimpanzee the incisor teeth are not only absolutely much larger (thicker and broader) than in man, but they are of far greater size in proportion to the molar series and to the entire skull. In the Gorilla, the transverse measurement of the four incisor teeth is not greater than in the Chimpanzee; they are therefore proportionately smaller; and in this respect, although still very far removed, the Great Ape makes a nearer approach to human dimensions. A further deviation from human type is seen in the greater inequality of the incisors of the upper jaw, the central incisors being considerably broader than the lateral. This inequality is greatest in the Gorilla, but in both species it is a marked point of differentiation. Each incisor has a well-developed prominent basal ridge on its posterior surface; and the outer angle of the crown of the lateral, instead of being entire, as in Man, is rounded off. In the lower jaw these teeth are equally characterised by their great size. As in Man, the lower lateral are broader than the central ones; but the former have the external angles of the crowns rounded off. In both jaws the direction of the incisive teeth departs from a vertical or nearly vertical position. In the incisors of the Orangs we notice a still greater divergence from human type in the superior breadth of the entire series, in the greater size of the upper central teeth, and the greater amount of inequality between them and the lateral. The central incisor of the upper jaw in *Pith. Satyrus* and *Pith. Morio* is of unusual size and strength, being double the width of the outer one, whilst its thickness is nearly equal to its transverse measurement. From their constant use in overcoming

The Enamel is continued farther down, and is thicker on the anterior and back part of the *Incisores* than on their sides, and is even a little thicker on the fore part than upon the back part of the Tooth. If we view them laterally, either when intire, or

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the resistance of hard and tough vegetable substances, they become worn down; and in the old Orang they present a broad abraded surface, which extends obliquely backwards from the cutting edge to the posterior margin of the base of the crown. The lateral incisors have their external angles obliquely truncated; in the lower jaw they exceed in transverse measurement the dimensions of the central. In the obliquity of their implantation in both jaws they exhibit the ordinary Quadrumanous character. In the Gorilla and Great Orang, as in the Quadrumana generally, a well-marked interval or diastema separates the upper incisors from the canine.

The incisors are six in number in each jaw in the typical Carnivora. In the Lion they form a transverse row; the outermost above is the largest, and resembles a small canine; the intermediate ones have broad and thick crowns indented by a transverse cleft. These teeth are employed in gnawing the gristly ends of bones, and scraping off the attachments of periosteum and muscles. The crowns of the incisors in the Hyænas form a similar transverse line; the crown of the external one above is laniariform; the crowns of the intermediate teeth are divided by a transverse cleft into a strong anterior conical lobe and a posterior ridge, which is notched vertically, giving to the tooth a three-lobed configuration. The inferior incisors increase in size from the first to the third; the second and third have the crown indented externally, but they do not present a posterior notched ridge; the conical points of these teeth fit into the depressions separating the lobes of the incisors above. The incisive teeth in the Dog form a segment of a circle in both jaws; they increase in size from the first to the third; the edge is divided by two notches into a large middle and two smaller lateral lobes. In the most aquatic and piscivorous of the *Mustelidæ*—viz., the Sea-Otter (*Enhydra*)—the number of incisors is reduced by the absence of the two central in the lower jaw; their number is still farther diminished in some of the *Phocidæ:* in the great proboscidian and hooded Seals (*Cystophora*) the incisor formula is $\frac{2\,2}{1\,1}$; they are, however, of large size, the two outer ones above being largest, and laniariform. In the young Walrus there are three teeth in each premaxillary above, and two on each side below; but they soon disappear, with the exception of the outer and upper one on each side, which remains on the inner side of the enormous canine tusk.

The normal number of incisive teeth, $\frac{3\,3}{3\,3}$, which we find in the extinct herbivorous Dichodon of the eocene tertiary deposits, is replaced in the existing typical Ruminants by the total suppression of incisors in the upper jaw, whilst the number six is retained in the lower. In the hollow-horned Ruminants *Antelopidæ*, *Ovidæ*, and *Bovidæ*, a callous pad supplies the place of the upper incisors, albeit their rudiments have been observed by Professor Goodsir and others in the embryo Sheep and Cow. The incisors in the lower jaw have low, broad crowns. Upper incisors are also absent in the solid-horned *Cervidæ:* in the Camels one laniariform incisor is present in each premaxillary bone. Professor Owen has described six deciduous upper incisors in the new-born when cut down through the middle, but especially in the latter case, it would seem as if the fang was driven like a wedge into, and had split the body or Enamel of the Tooth. They stand almost perpendicularly, their bodies being turned a little for-

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Dromedary, of larger size than any rudiments of these teeth which exist in the hollow-horned Ruminants.

The *Suidæ*, or Hog tribe, retain the typical dental formula which is exemplified in the *Chæropotamus Anthracotherium*, and other extinct non-ruminant Artiodactyles. In the Hog, the upper incisors decrease in size from the first to the third; the central upper incisors are inclined to each other, and touch by their prolonged inner surfaces; their crowns are short, strong, and obtusely pointed: the crown of the second is as broad as that of the first, but shorter and thinner; it has a trenchant and dentated edge, which soon, however, becomes worn down. The third is a small tooth separated by a short interval from the second. In the lower jaw, the incisors are long, straight, and sub-compressed: the third is the smallest, the second rather larger than the first. An excessive development of the canine and incisor teeth marks the genus *Hippopotamus*. Of the incisors there are four in each jaw; the lower attain the most remarkable development. The two median lower incisive tusks are cylindrical, of great size and length, and are worn obliquely on the outer and upper side of their extremity; the deeply-implanted basal portion is grooved longitudinally: the two outer incisors are likewise cylindrical and straight, but of smaller size; they exhibit an abraded surface on the inner side of the apex. A large persistent matrix occupies the excavated base of these teeth, and provides for constant growth and reparation. An ancient form of Hippopotamus which formerly inhabited India retained the typical number of incisors $\frac{3}{3}\colon \frac{3}{3}\colon$.

Amongst Perisso-dactyle *Ungulata* that number is retained in the genera *Equus* and *Tapirus*. In the Horse, the crowns of the incisors form the arc of a circle at the extremity of each jaw. They are distinguishable from the incisors of all other animals by the vertical fold of enamel which dips down into the substance of the crown from its broad, flat upper surface, like the inverted finger of a glove. In the moderately-worn tooth, the fold of enamel remains surrounded by a cavity, which is partly filled by cement and partly by the *dêbris* of the food. This constitutes the "mark" of horsedealers. The mark disappears in the aged animal when the tooth becomes worn still lower than the fold of enamel. In the different species of Rhinoceros, the incisor teeth present considerable variation. They may be absent, and when present they differ much in form and proportions, and it has been remarked that their development has a close relation to the development of the nasal weapon. The two-horned Rhinoceroses of Africa, which have one or both of the horns largely developed, and a great extinct species (*Rh. Tichorinus*) in which the horns attained a prodigious size, are instances of the total absence of these teeth in the adult condition. The Sumatran two-horned Rhinoceros, in which the horns are but moderately developed, exhibits incisors in both jaws; they also exist in both the one-horned species; but these teeth attained their largest development in an extinct hornless Rhinoceros (*Rh. Incisivus.*) The Tapir presents six incisors in each jaw. The upper median has a broad trenchant crown separated by a transverse channel, into which the wedge-shaped crown of the lower wards. Their fangs are much shorter than those of the *Cuspidati*, but pretty much of the same length with all the other Teeth of this Jaw. (*e*)

In the Upper-Jaw they are broader and thicker, especially the two first: their length is nearly the same with those of the Lower-Jaw. They stand a little obliquely, with their bodies turned much more forwards (the first especially) and they generally fall over those of the Under-Jaw.

The two first *Incisores* cover the two first, and half of the second of the Lower-Jaw, so that the second *Incisor* in the Upper-Jaw covers more than half of the second, and more than the half of the *Cuspidatus* of the Under-Jaw.

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incisor fits, from a basal ridge. The outermost pair of the upper incisors are large and canine-like, the lower are unusually small.

In the extinct genus *Dinotherium* the incisors are represented by two large tusks implanted in the deflected extremity of the lower jaw. The crowns of these tusks gradually decrease to a point; they are bent downwards and backwards; the base, like that of the tusk of the Elephant and Mastodon, is widely excavated for a persistent pulp. No corresponding teeth have been discovered in the upper jaw. In the existing Proboscideans, two deciduous tusks in the upper jaw, replaced by a pair of permanent tusks of large size, are the sole representatives of incisors; but in the extinct Mastodons, two lower incisive tusks were also present, although it is uncertain whether they were preceded by deciduous teeth. The tusk of the Elephant, meeting no opponent to its growth, increases to an enormous length, following the curve originally impressed upon it by the form of its socket. Its growth may be compared to the abnormal increase of the scalpriform incisor of the Rodent when accident has deprived it of an opposing tooth. In the female of the Indian species, the tusk is shorter and straighter, and less deeply implanted, than in the male. According to Cuvier, large tusks are present in both sexes in the African Elephant; at least, this is the case in certain localities. Professor Owen is of opinion that the smaller fossil tusks of the Mammoth (*Elephas primigenius*) which have been discovered belonged to the females of that extinct species. (1)]

(*e*) [A degree of departure from the perpendicular direction in the incisor teeth, especially in the upper, is a usual concomitant of the prognathic conformation; and although most common in the Melanian races, is occasionally observed in every variety of Man. Amongst the African nations, the prognathic development of the maxillæ, and the consequent obliquity of implantation of the incisor teeth, appear to be most remarkably expressed in the tribes of the West Coast. The Quaiquœ race, including the Bushmen and Hottentots, exhibit the prognathic character in a less degree than do the true Negroes. (2)]

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(1) Prof. Owen, Art. Odontology, Encyclopdæia Britannica, 8th edit., vol. xvi., pp. 440-477.

(2) 'On the Teeth in the Varieties of Man,' DENTAL REVIEW, 1860.

The edges of the *Incisores* by use and friction, in some people, become blunt and thicker; and in others they sharpen one another, and become thinner. (*f*)

(*f*) In barbarous and semi-civilised races, the incisors and canines become excessively worn down by the rough work to which they are put. The Esquimaux, the Fuegians, and the Oceanic nations, including both Malayo-Polynesian and Negrito varieties, exemplify remarkably the effects of attrition on these teeth. The same condition is frequently seen in Anglo-Saxon and Early British crania. The appearance of wearing down of these teeth is also very remarkable in many Ancient Egyptian and Guanche mummies. Blumenbach describes the incisors in Egyptian mummies as thick and round — not, as usual, flattened into edges, but resembling truncated cones; and the cuspidati are not pointed, but broad and flat on the masticating surface, like the neighbouring bicuspides. Mr Lawrence, who investigated the subject, came to the conclusion that this condition did not depend on any natural variety; and an examination of the teeth in two mummies containing the remains of children whose death had occurred between the completion and loosening of the first set of teeth, instituted by Dr Prichard and Mr Estlin, proved that the original conformation of the teeth in the Ancient Egyptian was in exact accordance with the normal type. There is, it may be added, no difference in the characters of the incisive teeth in the varieties of Man. In the Negro races, they are usually large, broad, and thick; but they are not of greater absolute dimensions than in numerous individuals among the leucous and xanthous varieties. (1)]

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(1) Lawrence, History of Man, 9th edit., p. 260; Prichard, Physical History of Mankind, vol. ii., p. 249; DENTAL REV., loc. cit.

ORIGINAL COMMUNICATIONS.

ON THE REDDENING OF TEETH.

By Dr MED. LEOPOLD, Practical Dentist in Stuttgart.

Translated from the 'Deutsche Vierteljahrsschrift für Zahnheilkunde'
(German Quarterly Journal of Dental Science) for April, 1861,
By George Henry, M.C.D.E.

A consideration of this interesting subject, which was introduced at the last meeting of the "Central Society" by Hr Fricke, in its anatomical and physiological aspects, has led me to entertain the following views with regard to it.

If slowness in the changes required by nutrition and slight absorbent power are characteristics peculiar to bone tissue, they are much more so with regard to the teeth, which are more nearly allied to epidermoidal structures. The bones become red through the presence of blood or of certain red colouring matters, as the *rubia tinctorum*, which are used in the medical treatment of diseases of the bones. As a rule, the red colour arises from the presence of the colouring matter of the blood, either in the blood-corpuscles, or set free in the serum. It is also thus with the teeth: tooth-tissue is not susceptible of true inflammation, nor is the passage of blood-corpuscles possible through the dentinal tubuli, which are so microscopically minute as to be only 0,0006 to 0,001 of a line in diameter, the corpuscles being the $\frac{1}{300}$ of a line in breadth. When, therefore, a tooth becomes red, this can only take place by imbibition of the colouring matter of the blood dissolved in the serum; and this permeation of the dental tissue under normal conditions proceeds from the interior towards the periphery of the tooth, for the source of nutrition and the vegetative life of the tooth has its seat in the pulp; the latter, together with the peridental membrane in close connection with it at the apex of the root, being abundantly supplied with blood-vessels, on the existence of which these physiological changes are dependent. An external nutrient supply from the peridental membrane is physiologically, if not exactly possible; yet it is very questionable, for the cementum in the normal state is not permeable, and, according to Kölliker's researches, it seldom contains Haversian canals and blood-vessels, and the presence of terminal dentinal tubuli is by no means constant. It is, therefore, evident that imbibition from the exterior of the tooth is not in accordance with physiological facts: moreover, the course and ramification of the dentinal tubes proceed from the pulp, commencing with open mouths on the parietes of the pulp cavity, and passing through the entire thickness of the dentine, as far as the enamel and the cementum. Besides,—and this is all-important,—the dentinal tubes in a healthy state contain a pale fluid, which under diseased conditions may easily impart a red appearance to the tooth, through the admixture of the colouring matter of the blood; and, as these canals exist in endless numbers, freely anastomosing with one another, the result is the impregnation with colouring matter, according to the quantity of the effusion and the extension of the inflammatory process. Suppose, for instance, the principal tubuli are alone infiltrated, the redness will thus present a more streaky or dotted appearance, because the chief tubuli ramify but little: if, on the other hand, all the tubuli, with their minutest ramifications, are infiltrated, the tooth will present a saturated redness. The whole tooth may appear to be reddened, including the cementum and enamel; first, because of their transparency; and secondly, by reason of the terminal tubuli entering partially into the enamel and cementum, and there terminating either free or in loops.

The above, in my opinion, is a correct representation of the manner in which teeth become reddened; a phenomenon, moreover, which is not an affection peculiar to the dental tissue, but presents itself less frequently here, owing to the peculiar anatomical structure of the part, than in other tissues of the body—as, for instance, in the eye.

The colouring may vary from a rosy to a yellowish or bluish tint, according to the stage of the disease; for the colouring matter of the blood undergoes changes when it is no longer contained in the corpuscles. Whether the sanguineous exudation is capable of further organisation remains to be determined.

The teeth have been observed to be reddened after mineral-water cures, no doubt the effects of the salts of iron; but the affection is temporary, disappearing in a short time, which I have had frequent opportunity of noticing. It is also a fact confirmed by experience, that *arsenic paste* can exert its corrosive effects in the most delicate tooth-structure; and I saw a tooth lately which had been treated with this agent, and had assumed a deep reddish brown colour, showing how exceedingly careful it is necessary to be in using this otherwise excellent remedy.

With regard to the causes of this reddening, they are constitutional and local. The examples of the affection attending cholera and death from suffocation were mentioned in the Transactions of the Society. In general, diseases in which the blood proceeds to decomposition are causes. The local causes are of greater interest to the Dentist—viz., mechanical injuries, as from a blow or fall, &c., and inflammation of the soft portions of the tooth, as the pulp and periosteum. The effects of medicinal colouring matter have been alluded to; but as specially influencing the teeth, little is known to me. The most frequent cause is most probably "inflammation," and Hr Fricke lays particular stress on its rheumatic origin; but I have not been able to trace one of my cases to this source, and the word "rheumatic" is one so vague and indefinite that I do not deem it advisable to dwell upon it.

In conclusion, I will mention a few cases which have fallen under my observation, referring slightly to their peculiarities, and adding a few words as to their treatment.

When a student, I witnessed a case of saturated redness in the tooth of a young man twenty years of age, caused by a violent blow with the ivory knob of a walking-stick: in this case the change of colour was the immediate result of the injury, and never entirely disappeared; at least, I saw the case again several years later, and the tooth was still strikingly stained, though more yellowish. No treatment had been attempted.

I remember a second case of acute origin, in which, after the repeated application of leeches, the redness gradually but effectually disappeared.

In the summer of last year, I destroyed the pulp of a central incisor for a lady about twenty-five years of age, by means of a barbed drill, preparatory to plugging with gold: the hæmorrhage was greater than usual, on which account I deferred the operation for a fortnight, during which time there was no further effusion of blood. Several days after completing the operation, there was a return of hæmorrhage (Nachblutung), and in a very short time the tooth turned quite red. That in this case imbibition took place in the dental tissue itself, is proved by the circumstance that the removal of the filling, cleansing the pulp cavity, and keeping the cavity open for a time, had only a slight influence on the colouring. I see the lady occasionally, and the tooth is now, after eight months, almost as red as at first, and I am about to replace it with an artificial substitute at the patient's urgent request. The tooth has been entirely free from pain from the first.

The following is the most instructive case, and one very vivid in my memory, as it has led to an operation only lately. Two years ago, a lady, about thirty-two years of age, of delicate appearance, with wax-like complexion and all the signs of chlorosis, consulted me about a tooth, which, in the course of a few weeks, had assumed a darkened colour, and ultimately a striking red: this occurred without any pain, and beyond the above-mentioned malady there was no other pathological condition, even locally. Doubting the efficacy of treatment, I consoled the patient with the observation "that it would right itself." A few days ago she visited me again—I having in the long interval quite forgotten the case—and requested to have another tooth in its place; upon which I excised the crown of the left central incisor, and substituted a pivoted tooth. Of course this was a favourable opportunity for a closer examination of the tooth: the redness proceeded from the centre—*i. e.*, radiating from the parietes of the pulp cavity towards the periphery; in the middle it was of a dark-bluish red, externally of a paler hue; the enamel was perfectly free from any tinge, for on making a longitudinal section it did not exhibit the slightest discolouration; on drilling the canal in the root, a dirty, reddish, fœtid fluid escaped; there was no trace of caries. The new tooth has answered well up to the present, without the occurrence of any inflammatory reaction.

A few words more with regard to treatment. Fresh cases of acute transudation, especially when caused by external violence, appear to be accessible by the repeated application of leeches, which treatment should always be resorted to: perhaps, drilling into the pulp cavity (trephining) might be productive of beneficial results. When of slow origin and of a chronic nature, I doubt the efficacy of medical aid, for by means of pharmaceutical agents no result is attainable. When the discolouration is prominently conspicuous, the only remedy is artificial reparation. I tried once to bleach a tooth with *chloride of lime*, and was soon convinced as to the inutility of the attempt.

The following observations on the above subject are extracted from a short paper contributed to the first number of the 'Deutsche Vierteljahrsschrift für Zahnheilkunde,' 1861, by Hr Fricke of Lüneburg:—

When the affection is of acute origin, manifesting itself by sudden and violent pain, the tooth exhibits a heightened tone of colour and greater extension of redness; the pain is generally continuous, and the patient is compelled to seek relief in extraction. Let its course be either chronic or acute, the pain experienced is similarly indescribable with that produced by exostosis. Hr Fricke believes the occurrence of this phenomenon predominates in the male sex, and between the ages of twenty and thirty. He attributes the discolouration to impeded circulation attending inflammation, and can discover no structural alteration with the aid of the microscope; yet, he has observed a proneness to fracture at the stained portion of the tooth. Placing the teeth in water for twenty-four hours did not influence their colour in the least degree, and specimens which he had possessed for ten years remain unaltered. In three years, seventeen cases had occurred in his practice; seven in 1858, three in 1859, and seven in 1860. He thought it not improbable that the appearance of this phenomenon might be endemic, and urges his fellow-practitioners to bestow a careful examination on all teeth extracted, in order to determine the question, particularly as the characteristic stains, which vary in tint, so easily escape detection.

[It appears that the teeth of the lower animals are subject to this malcondition as well as those of human beings, as evidenced in a skull of *Lutra vulgaris*, in the possession of Hr Fricke.—G. H.]

DISEASES OF THE DENTAL PERIOSTEUM:

A COURSE OF LECTURES DELIVERED AT THE COLLEGE OF DENTISTS OF ENGLAND, SESSION 1860-61,

BY R. T. HULME, M.R.C.S., F.L.S.

LECTURE II.

(Continued from page 294).

The description which has been previously given of chronic periostitis, and the course which it pursues, applies especially to that form of it which results from caries having attacked the crown of the tooth. These cases will frequently continue for one, two, or even three years, the patient being subject at certain intervals to attacks of pain accompanied by inflammation: these paroxysms often terminate in the formation of matter, which ultimately becomes discharged, and is followed by an interval of ease. In most of these cases, little is to be hoped for from treatment, and the only efficient remedy consists in the extraction of the tooth. If the patient will not submit to this, then the only alternative is to combat the symptoms as they arise: warm and emollient fomentations, anodyne applications, or mild purgatives, will alternately afford relief; and where matter has formed, it is especially necessary that a free opening be made for its exit.

Chronic periostitis may, however, arise from other causes than caries of the teeth, and there are forms of it which constantly occur in teeth that are otherwise perfectly sound. Dr Maréchal de Calvi has recently published some remarks upon chronic dental periostitis, which have been reproduced in the medical periodicals of this country, and have created considerable discussion in France. In a paper published in the *Compte Rendu* for 1860, and reprinted in *L'Union Médicale*, this writer has called attention to a disease which, he says, either primarily or secondarily affects the periosteum of the teeth, and ultimately terminates in their expulsion. He considers that the disease has not hitherto been described, and therefore proposes to call it *expulsive gingivitis.* In its earliest stage, he remarks, the disease is generally confined to the processes of the gum passing between the teeth, but sometimes it is entirely intra-alveolar; the teeth or tooth become loose, and nothing is seen externally. Amongst the symptoms, Dr Maréchal enumerates acute pain on the contact of hot or cold fluids, or when the teeth are pressed against each other; mastication is impeded and painful, the teeth are apparently elongated, and there is a purulent discharge, accompanied by an offensive taste and odour in the mouth. We can hardly fail, I think, to recognise in this description the general characters of chronic periostitis. The disease may, in fact, present itself under two forms: in the one, it commences in the periosteal membrane; while in the other, the gum appears to be the part which is primarily affected, and from this it spreads to the periosteum. The first is that which I have already described as chronic periostitis, while the second corresponds to what the older writers speak of as scurvy of the gums. The following is Mr Fox's description of this disease, which shows that Dr Maréchal is mistaken in saying that the disease which he proposes to term expulsive gingivitis has hitherto been undescribed. "The most common disease of the gums," says Mr Fox, "is that which has been usually called scurvy in the gums; thus denominated from assuming an appearance similar to that which happens to persons afflicted with sea-scurvy. This disease is generally marked by the gums becoming redder than ordinary, and enlarged from a turgescence of the vessels, which are made to bleed by the slightest causes, such as the use of a toothbrush, the biting of a crust, or even by only sucking them.

"If the complaint be not attended to in this stage, the gums become very soft and spongy, and shortly afterwards they are affected with considerable soreness, being so tender as scarcely to allow the mastication of food. This is often followed by a discharge of matter at the necks of the teeth, and an ulceration may be observed on the edges of the gums between the teeth; also those parts which form the arched appearance are soon destroyed, so that the gums have a uniform straightness, and the necks of the teeth are consequently uncovered.

"This disease next proceeds to the alveolar processes, the substances of which are destroyed by absorption: at length the teeth become loose, and in a few years drop out, one after the other, at short intervals, until the person is rendered toothless."*

Few will doubt that we have here an exact description of the expulsive gingivitis of Dr Maréchal. Nevertheless, medical men, and especially Dental Practitioners, are indebted to this gentleman for having called their attention to this particular form of periostitis, since it is highly probable that teeth which are now given over to the ravages of disease might in some instances, under a different system of treatment, be preserved for many years.

In the *Medical Times and Gazette* for 1853, vol. xxvii., p. 55, Dr Inman has described a well-marked case of this disease, and recommended the same mode of treatment as that proposed by Dr Maréchal: indeed, it would almost appear that this medium, the iodine of potassium, may be regarded somewhat in the light of a specific for these affections of the dental periosteum, for we shall see hereafter that it is equally beneficial when this membrane becomes the seat of disease. The patient, Mr S——, aged forty, applied to Dr Inman for advice in November, 1851, under the following circumstances:—

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* *The Natural History and Diseases of the Human Teeth*, by Joseph Fox, part ii., p. 78.

Twelve months previously, he had lost an upper molar tooth in a very curious manner; a second he had lost a few days ago, and a third was now loose. His appearance was sallow and unhealthy, but he was strong, and able to take a great deal of fatiguing exercise. Twenty years ago he had had a slight attack of syphilis, which was cured, he believed, without mercury. He had no secondaries, and had never been salivated.

About a week ago, he was suddenly attacked with a feeling of intense debility, so great that he reached his house in the country with great difficulty. He took a warm bath, and went to bed. The debility continued all the next day, and was accompanied by excessive pain in a circumscribed portion of the dorsum of the foot. The debility then began to wear off; next day the pain shifted to the tibia, the next day to the femur; it remained about a day, and then left him altogether. The painful spot might be covered with a half-crown, and was in the front middle of the thigh and leg. He had, however, a very slight, almost imperceptible aching in the face, and a little swelling: otherwise he felt perfectly well. The next day an upper molar fell out, followed by an offensive discharge from the socket; and on the following day the canine next to it came out, and appeared perfectly dead. The last molar on the left side was lost under precisely similar circumstances twelve months ago; a fœtid discharge continued for some weeks, some fragments of bone exfoliated, and the alveolar process has since been absorbed. On examining the mouth, a few points of superficial ulceration were seen about the incisors; and in the vicinity of the recently-emptied sockets I could find no exposed bone. I recommended the application of the nitrate of silver in solution to the ulcers, and iodide of potassium internally.

His appearance improved under the iodide, and he continued free from all recurrence of the complaint until October 27th, 1852, —about twelve months, that is to say, since the preceding attack. On that day he got cold and wet while shooting, and had a return of his old symptoms. Another tooth dropped out. Shortly afterwards, a large portion of the alveolar process came away, the remains of the second attack; and I could feel a portion of dead bone in the vicinity of the remaining canine. Two other teeth were loose, and there was a fœtid discharge from the recently-emptied sockets. I could detect no ulceration in any part of the mouth. His general health seemed good, but his complexion was sallow. The same plan was recommended, but without any effect; for I am informed by the Dentist with whom he first came to me, that he had lost the whole of the teeth in the upper jaw. They all became loose one after the other, and were taken out by the fingers. The teeth in the lower jaw are perfect. From first to last, he has never had any pain in the face, or any notable signs of inflammation in the gum or alveolus. He has never been struck on the teeth, or suffered any bodily injury.

The most important communication which has been called forth by Dr Maréchal's paper, is one by Dr Edward Carrière. This gentleman, after observing that in the prime of life suppurative or ulcerative gingivitis with gradual expulsion of the teeth is rare, while it is not so at a more advanced period, says: "But it is to be remarked that, geographically, expulsive gingivitis is attached to certain localities, where it is exceedingly common and may be said to assume the form of an epidemic, and where it attacks all ages, the young as well as the old. It shows itself, after a few years, in married women, in young girls, and even in boys before the age of puberty." The region where Dr Carrière noticed these effects, and was enabled to watch the disease in all its various stages, was in the country of Lower Austria, which extends from the south of the plains of Vienna as far as the province of Styria. From his observations made in this and other parts of Europe, Dr Carrière comes to the conclusion that in districts where scrofula prevails there also will be found this kind of chronic periostitis, attacking the investing membrane of healthy teeth and gradually expelling them from the mouth. The same remedy, he remarks,—viz., iodide of potassium,—which is so beneficial in the glandular affection scrofula, is equally serviceable in the tooth affection. I have been somewhat diffuse in my remarks upon this portion of my subject, in the hopes of bringing it under the notice of the Dental or Medical Practitioners whose practice may lie in any of the marshy, scrofulous districts of this country, and ascertaining whether their experience of the disease in question accords with that of Dr Carrière.

I pass on to the consideration of those cases in which the periosteum of the tooth becomes affected through the constitution; and first, of rheumatism. Rheumatism is not a local, but a constitutional disease, depending upon a morbid condition of the blood. It most commonly fixes itself in the membranes and tendons of the body. The regions of the joints are those most frequently attacked by it; it is remarkable for shifting from one joint to another, and sometimes affects the membranes of the heart. The disease may present itself in an acute or chronic form, the latter sometimes following an acute attack, but more frequently it is not so preceded; one form of chronic rheumatism originates in gonorrhœa, and hence it is termed gonorrhœal rheumatism. It is in its chronic state that rheumatism appears to affect the periosteum of the teeth. The periostitis is not generally ushered in by an acute inflammatory stage, but appears to pass at once into the purulent stage. The teeth become loose; and upon pressing the gum over the affected teeth, a small quantity of purulent matter is discharged from the neck of the tooth. The teeth are very tender, so that the patient cannot use them in mastication. I know of no characteristic marks by which the rheumatic periostitis can be distinguished from the forms which have been previously described, excepting by inquiring into the previous history of the case. In these cases the periostitis depends upon the state of the constitution, and it must therefore be treated by remedies which act generally and through the constitution, as well as by means of local applications. Some of the various astringent and tonic lotions might be useful locally, but the principal means of cure consists in the administration of the iodide of potassium in five-grain doses three times a day: it is best administered in some mild vegetable infusion.

The first person who called attention to this state of the dental periosteum, and recommended the use of the iodide of potassium, was Dr Graves of Dublin. In his Lecture on Periostitis, he says: "Before concluding, let me call your attention to an affection nearly allied to periostitis, by which looseness of the teeth is caused—namely, inflammation of the alveolar processes and sockets. Sometimes this originates in the disease of the tooth itself, or of the gums; but in other instances the diseased process commences in the alveolar periosteum, and by spreading to the socket and gums, it gives rise to great pain, swelling and sponginess of the latter, while it eventually detaches the fangs of the teeth implicated in the attack from the grasp of the sockets, and thus at last the teeth fall out, though in themselves they exhibit no appearance of decay.

"The progress of the disease is accompanied by extreme pain; and as a puriform discharge oozes out between the gums and inflamed periosteum, many limit their attempts to local means, and often succeed in effecting a cure by frequent applications of leeches to the inflamed gum, and, in very obstinate cases, by incisions made freely through the gums and periosteum. Last year a patient of mine was thus affected, and thus treated; and although under the care of a most skilful Surgeon, and of an eminent Dentist, he lost successively a left bicuspis and molar of the upper jaw. His sufferings were for a short time relieved by the extraction of each tooth, but in a few days became as agonising as ever, when, finding all the neighbouring teeth loose, and being told that they also must soon be drawn, he had recourse, in despair, to a celebrated Homœopathic Doctor, whose infinitesimal doses completely failed, for the patient's sufferings were produced by a direct physical cause, which lay far beyond the limits to which the influence of even the most powerful imagination can possibly extend. Happening to mention his wretched state to me, I immediately recollected that a year before I had successfully treated him for a periostic affection of the sternum and ribs, and that hydriodate of potash was the medicine which served him most. I recommended him to use ten grains of it three times a day, and had the satisfaction of perceiving a daily improvement, so that pain and inflammation soon ceased, and in about ten days the teeth were all fastened.

"The periostitis to which this gentleman was liable was of a rheumatic nature; otherwise his constitution was sound, and he was only thirty-four years old."

If the breath is rendered offensive by the discharge, the liquor sodæ chlorinatæ, in the proportion of one ounce to eleven of water, forms a useful gargle, and corrects the fœtor of the discharge.

The action of mercury upon the constitution shows itself by producing an increased flow of saliva, a peculiar fœtor of the breath, and a spongy and vascular state of the gums. If the mercury is persevered with, the periosteum of the teeth is affected; the teeth are apparently elongated and loose in their sockets, accompanied by a purulent discharge from them; the affection spreads to the periosteum of the jaw-bone, which ultimately becomes necrosed, and larger or smaller portions of it exfoliate. The first indication in these cases is to withdraw the mercury, and then to apply such remedies, general as well as local, as will obviate the injuries it has effected. Mild purgatives will help to eliminate the mercury, and at the same time the administration of the chlorate of potash, in doses of from twenty to thirty grains twice or thrice a day, will in most cases speedily restore the membrane of the tooth to a healthy condition. The same object may be accomplished by the iodide of potassium in from three- to five-grain doses three times a day, given in the same manner as in the rheumatic affections of the dental periosteum. To obviate the fœtor of the discharge, a gargle should be used composed of the liq. sodæ chlorinatæ. Dr Watson says that when the flow of saliva and the soreness of the gums form the chief part of the grievance, he has found nothing so useful as a gargle of brandy-and-water, in the proportion of one part of brandy to four or five of water.*

Formerly, when mercury was administered in excessive doses, or persevered in for an inordinate period of time, as necessary for the cure of the venereal disease, these disastrous effects upon the teeth and gums were common enough. Fortunately, in the present day the administration of mercury is never carried to such an extent as it was during the last century, and these cases are now, at least in England, comparatively rare. Those cases which do occur arise, for the most part, in persons whose constitutions render them very susceptible of the action of mercury, or in working men whose daily labour brings them in contact with the fumes of the metal, such as those who are employed in gilding by means of mercury, or silvering looking-glasses.

Phosphorus.—Another poison which, when it gains entrance into the system, exerts its baneful effects sooner or later on the dental periosteum, is phosphorus. Cases of this kind seldom if ever come under the notice of the private practitioner; happily, they are confined to a few unfortunate individuals whose vocation in life exposes them to the fumes of phosphorus, either in its manufacture or in the making of lucifer-matches. The affection of the dental periosteum appears, however, to be a secondary effect of the poison; the disease does not commence in the fang of the tooth, but in the periosteum of the jaw-bone, and, by the time the teeth are affected, large portions of the jaw-bone are already so far diseased that they must be removed, either by Nature or by the interference of the Surgeon, before the patient can hope for any amelioration of his sufferings. In these cases the tooth affection is altogether of minor importance. The first indication in the way of cure is to remove the patient from the polluted atmosphere of the manufacture; and the next, to assist Nature in removing the dead bone. The history of the case and the peculiar odour of the breath at once determine the nature of the affection.

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* *Lond. Med. Gaz.*, Dec. 25, 1860.

Gout.—This disease is said sometimes to affect the teeth; indeed, it is frequently put down as one of the causes of dental periostitis. Harris* and Richardson† have each recorded an instance of tooth disease which appeared to depend upon the gouty diathesis. As far as the writer knows, these are the only instances actually mentioned, although several of the older writers speak of toothache in connection with gout.

Even in the two cases referred to, it is not clear that the pain originated in the periosteum, and not in the pulp of the tooth, as the paroxysm only lasted a short time. Gout, like rheumatism, has a tendency to fix itself in the fibrous structures of the body, and may therefore select the periosteum of the tooth. Should such a case come under treatment, it is evident that constitutional and not local remedies would be required.

ON THE SALIVARY GLANDS AND SALIVA,

INCLUDING THE ANATOMY, PHYSIOLOGY, AND DISEASED CONDITIONS OF THE SALIVARY SYSTEM.

A Course of Three Lectures delivered at the College of Dentists, Session 1860-61.

By B. W. RICHARDSON, M.A., M.D.

(Reported specially for the Dental Review by Mr Geo. Henry, M.C.D.E.)

(Concluded from page 351.)

LECTURE III.—June 11th, 1861.

The third and last lecture of this course was devoted to the consideration *of the diseases originating in the salivary glands, and of diseased saliva and its effects.* After a brief recapitulation of the preceding lecture, Dr Richardson continued as follows:

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* *Opus cit.*, p. 378.

† *Opus cit.*, p. 118.

We now pass on to a consideration of the diseases of the salivary system. These may be divided into three great classes :

I. Diseased conditions of the glands themselves.
II. Diseased conditions of the saliva secreted.
III. Results of diseased conditions of saliva.

I. *Division. The Diseases of Glands.*—These diseases admit of subdivision into—(1) Diseases of structure, which may be (*a*) acute, as in mumps ; (*b*) chronic, as in malignant parotid ; (*c*) hypertrophy. (2) Diseases of the secreting surface of the gland, leading to salivation, which may be (*a*) induced or toxical, and (*b*) spontaneous.

We may have inflammation in the glands arising from specific causes, as in simple parotitis, and extending to surrounding parts. The most common disease of this kind is the *Mumps*, "*Cynanche parotidea*," which consists of a swelling of the parotid, extending over the neck, and caused by inflammation of the parotid : other salivary glands may be involved, rendering deglutition difficult. The disease is in general without danger, and scarcely requires medical aid. It is ushered in with febrile excitement: the patient becomes suddenly cold, then hot ; there is a numbness about the ear, and dimness of sound ; then the parotid glands become enlarged. I have known them to enlarge within twelve hours after the appearance of fever, but I have known, again, the enlargement to be held back some days ; sometimes in these cases the secretion is suppressed altogether. The gland is very hard and tense, and remains so often for two or three days ; but it returns to its normal condition, the disease generally declining about the fourth or fifth day. Sometimes the sub-maxillary gland is involved, but it never becomes so inflamed and enlarged as the parotid. The inflammation rarely proceeds to suppuration. Children are more subject to the disease than adults. Occasionally it has been known to change from the neck to different parts of the body, as to the mammæ and other glandular structures : repelled from these parts, it has affected the brain, and proved fatal; but such a result is exceedingly rare. Why this disease should arise, whether it occurs by the inhalation of some poison, contagion, or by meteorological influence, is not known ; certainly it is an epidemic disease.

I have a few times seen acute inflammation of the parotid with scarlet fever ; this is rare, but when it does occur the inflammation is most acute. In one such case I knew the gland to suppurate and to leave a child with a paralysed face, owing to the facial nerve being destroyed. A simple inflammation of the salivary glands may occur occasionally in childhood during teething. The affection is slight, and subsides when the teeth appear.

We have, again, certain chronic diseases of the parotid gland.

The old writers have described one called "malignant parotid." This sarcomatous enlargement is very rare. When it occurs, it assumes a cancerous character early in its course: at first the gland is tense and hard, then the surface of the skin breaks and sloughs: such cases are always fatal. We have, however, chronic enlargements of the gland which are not malignant. I have seen one case of this character, in which the gland, appearing first to be inflamed, became very hard, giving much pain from tension, and interfering with the movements of the jaw; but under iodine this subsided, and has not returned. I have also read of a case in which there was simple general enlargement of the parotids with profuse secretion of saliva; and, lastly, there have been instances where the gland has become charged with hydatid cysts, which have given to it great enlargement and tension. These cystic formations are not uncommon in glandular structures—*e. g.*, the thyroid gland in the front of the neck, the gland that by its enlargement constitutes goître, or full throat, is often charged with these cysts.

Under the second head, we have diseases occurring to the secreting surface of the gland. Here the cell structure takes on very active functions, and we may have enormous and profuse salivation.

(*a*) *Toxical Salivation.*—In these cases a poison is introduced into the body, and is absorbed into the blood; the salivary glands, cheeks, tongue, and fauces become swollen and inflamed, and there is a flow of peculiarly fœtid saliva, often with ulceration or sloughing of the gums. Mercury, conium, and a few other bodies have the power of producing toxical salivation.

(*b*) *Spontaneous Salivation.*—Sometimes we have salivation without any known toxical agent. In the old 'London Medical Journal,' Mr Davies records a case in which there were four to five pints of saliva discharged per diem. Mr Powell gives a case in the 'Transactions of the College of Physicians,' in which the cause of the salivation was traced to a piece of wool which had been placed in the ear, and so irritated the salivary organ; a pint to a pint and a half was daily discharged from the gland in this instance. Occasionally in children, during dentition, there is profuse salivation; and in after life, irritation in a tooth may produce excessive secretion.

II. *Division. Diseases of Saliva.*

1. Saliva charged with morbid poison or specific virus.
2. Saliva surcharged with salts.
3. Saliva containing free acid.
4. Saliva containing sugar, bile, &c.

1. The saliva may be charged with a specific virus, derived from blood in a morbid state, after inoculation from the bite of

a rabid animal, as a dog or cat. From the dog, the virus is, therefore, transmissible; but whether it is so from the human being, is doubtful. Many attempts have been made to discover the specific property in the fluid, but all speculations up to this time have been fruitless. Ptyaline has been supposed by some to be the substance, also sulpho-cyanide of potassium. The evidence is nearly conclusive that the poison lies in the saliva, but in what constituent is not known; for Dr Wright injected the veins of a dog with healthy saliva, and the results were the production of symptoms of hydrophobia. Hydrophobia occasionally occurs in dogs that are chained up, and therefore unable to carry out their natural instincts.

2. The saliva may be surcharged with saline matter, evidenced by the frequent occurrence of excessive depositions of tartar on the teeth, or in and near the orifices of salivary ducts. We saw what were the elementary constituents of the saliva on the last occasion; I will now give the results of Dr Wright's analyses of salivary calculus in three experiments, contrasting them with those of Von Bibra:

	Dr Wright's.			Von Bibra.
Carbonate of Lime - - -	81·3	79·4	80·7	13·9
Phosphate of Lime - - -	4·1	5·0	4·2	38·2
Chlorides of Sodium and Potassium	6·2	4·8	5·1	38·1
Animal Matter - - - -	7·1	8·5	8·3	
Phosphate of Magnesia - -	——	——	——	5·1
Water and Loss - - - -	1·3	2·3	1·7	6·3
	100·0	100·0	100·0	

As to the reason why these salts should be thrown out by the saliva, we are yet quite uninformed The phosphates seem to be thrown out in greater abundance in patients with the gouty and phosphatic diatheses. In phosphatic calculus there is a large amount of saline matter. There can be no doubt whatever, that the glandular systems are the outlets from which these specific secretions are poured.

3. Certain diseases may arise from acidity of the saliva. One or more free acids may be in solution, but we are unable to arrive at a conclusion as to the cause of their presence in the saliva—nor is it discovered definitely what acids are presented in this fluid. Many opinions have been advanced on this subject: some say it is the lactic, others the phosphoric acid; the acetic, oxalic, and muriatic, are enumerated by various authors as having been detected in the saliva. It is again assumed by some that the acids are not originated in the saliva, but in the secretions of the mucous membrane of the mouth; in which case the acids which have been detected in the saliva must have been principally

derived from the mucus. There can be no doubt that certain diseased conditions of the general system specially influence the production of acidity, of whatever kind. Our ignorance on this subject is not wonderful, since it is so difficult to procure acidulated saliva in any quantity sufficient for analytical purposes. Acid saliva occurs in persons with rheumatic affections, and in patients affected with chronic gastritis and dyspepsia; also in children with aphthous gums; and it is most probable that an acid is the cause of cancrum oris.

4. We now come to the last point with regard to the morbid conditions of saliva, in which that fluid may contain sugar, urea, and even bile. Dyspeptic cases are frequent where persons complain of having a very sweet saliva; sugar is then being secreted, and, may be, is passing off in the urine as well. These are cases which often get well with tonic treatment. Again, in confirmed diabetes we may have a considerable quantity of sugar in the saliva and urine. Urea has been detected in the saliva in Bright's disease: this substance (urea) is a narcotic, and is very soluble in water. Lastly, the constituents of bile may pass off with the saliva. A case recorded by Huxham strongly brings out this fact. These are scarcely to be called diseases of the salivary secretion; they are simply conditions of the saliva, arising under morbid systemic influences; the glands themselves are unaltered, except in being excited to more or less active function.

III. *Division. Results of Diseased Saliva.*

1. Results of rabid saliva.
2. Results of supersaline saliva.
    (*a*) Salivary concretion in ducts.
    (*b*) Salivary fistula.
    (*c*) Salivary calculus.
    (*d*) Ranula.
3. Results of acid saliva.

1. I will not add to the observations already made with regard to the effects of rabid saliva, as it would lead me unnecessarily to a further consideration of hydrophobia.

2. *Results of Supersaline Saliva.*—When saliva is thrown out of the system surcharged with saline matter, we get specific changes. (*a*) *Salivary concretion in ducts* consisting of a deposit of saline matter on the passage of the salivary fluid through the glandular ducts. I saw a man once with a very large concretion seated by the side of the frænum linguæ. These are very simple to diagnose; they are rough and irregular, and sometimes push their way out of the ducts of themselves, the mouth of the duct becoming very wide: when they do pass out in this way, they not unfrequently produce a (*b*) *salivary fistula.* But salivary fistula is not always produced by salivary con-

cretions; we may have it when a wound or an ulcer has made a passage between the duct and the skin or mucous membrane, allowing the saliva to escape. (*c*) Deposits on the teeth, tartar, are the most common results of diseased saliva. The parts particularly exposed to the deposition of salivary calculus are the lingual surfaces of the lower incisors, and the buccal surfaces of the upper molars, between the teeth, and inside the margin of the gum around the necks of all the teeth. But you are all so well acquainted with these cases, coming in contact with them daily, that I need say no more of them. I may, however, add that there are two conditions peculiarly favourable to this deposition—viz., a great tendency to secretion, and great want of cleanliness or gross neglect. Tartar may be either of a yellow, brown, black, or green colour; and generally the darker the colour, the harder the deposit, and *vice versâ*. The pale tartar is sometimes deposited very rapidly, and in very large quantities; the specimens before us are remarkable illustrations of this fact: whereas the hard black or green tartar is never seen to any very great extent. The manner of deposition appears to be by layers mostly on the posterior surfaces of the front teeth of the lower jaw. Its thickest part, or base, is that immediately in contact with the margin of the gums: this tapers off smoothly towards the incisive edges, owing to the constant play of the tongue and food. The roughness of the base appears to be the immediate cause of diseased action in the gums, inducing irritation, inflammation, and recession, with consequent absorption of the alveolus. (*d*) Lastly, we have to consider a little swelling which appears underneath the tongue by the side of the frænum, called ranula. Some assert that this is not the result of concretion, but a true cyst. It may arise from obstruction in one of the Whartonian ducts, or mucous follicles. I have seen one case where the patient could not articulate, or scarcely swallow, the swelling or tumour, by the opening of the submaxillary duct, being so large and tense.

3. *Results of Acid Saliva.*—The effects of acid saliva are twofold: (*a*) a corrosive effect, producing a chemical action on the teeth; and (*b*) an effect on the soft parts leading to ulceration. Respecting the frequency of caries from acid saliva, I do not think that is very great; for although under the action of an acid there is no doubt teeth are subjected to chemical dissolution of structure, yet acid saliva is not so common a cause of caries in these organs as is generally supposed, inasmuch as the cases are rare in which the saliva loses its alkaline protective power, and assumes the acid reaction.

Treatment.—In concluding this lecture, we will take a brief glance at the treatment of the diseases we have considered. That of mumps is very simple, only calling for medical aid in extreme cases. Mumps generally gets well of itself if let alone; mild aperients and a good sweating are very useful; the Turkish bath would be an excellent remedy. With regard to chronic enlargements of the parotid, the most effectual cure for removal is the iodide of ammonium: an ointment consisting of iodide of ammonium ℈ij., and spermaceti ointment one ounce, is an excellent composition. A little of this taken on the hand, and rubbed twice daily into the part, is very effectual. In cystic disease, the injection of iodine, as occasionally practised, is of great value. The malignant diseases admit only of general treatment. For diseased condition of the saliva, where it contains a specific virus, we can do nothing; we know no cure for hydrophobia. Purgatives are useful in cases where there is tendency to salivary deposit: the tincture of the muriate of iron is very useful. In those conditions of the saliva in which there is acidity, the treatment is to be preventive as well as curative. In children, change of diet is necessary, with a certain avoidance of bread: bread is not a sufficient means for the support of life, as is commonly supposed. In the acid condition of the saliva with fœtor of the breath, washes of a solution of chloride of lime, or of oxygen water, as the peroxide of oxygen, are the most effectual local remedies. Salivary concretions in ducts are readily removed, as I have before mentioned. The treatment of salivary fistula requires careful and continuous attention: caustics will sometimes close the fistula; and if they do not, the edges of the fistula must be pared in order to induce partial union by adhesion: sometimes the actual cautery is required. With regard to salivary deposits on the teeth, the "modus operandi" for removal is known to you all. The treatment of ranula is by removal of the mass; some are content with incising the growth, others with the application of caustics—a tedious way of procedure. When the saliva is yielding urea, or bile, or sugar, we can do nothing as regards the salivary glands, but must watch the case, and treat according to the diathesis.

[In giving this brief account of the above Course of Lectures, I have endeavoured to condense only the more important points. I have consequently omitted all those details by which lectures in the hands of a practised lecturer are rendered not merely instructive, but equally agreeable. My object is attained, if I have presented to the readers of the Review such an outline of the Course as may convey a fair idea of the subjects discussed and elaborated.—G. H.]

THE DENTAL REVIEW.

LONDON, SEPTEMBER, 1861.

The question of advertising, in its relation to the Members of the Dental Profession, is one requiring for its discussion a calmness and a judgment which in late debates, conducted in the heat of party feeling, have been in no way considered. We propose in this article to endeavour to remove ourselves from the arena of strife, and to take up the question in its broadest sense, irrespective of petty jealousy or prejudice.

It appears to us, then, that the point at issue resolves itself into two divisions :—1st, Is it allowable that Dentists under any circumstances should advertise ?—2nd, If so, what is the kind of advertisement that should be permitted ?

On the first of these positions there cannot be a doubt that the body of respectable Dentists throughout the kingdom is divided ;—the one side taking the extreme view, that advertisements of every kind and shape are as objectionable in Dentistry as in Medicine ; the other side affirming that, while false and quackish advertisements are an indelible disgrace, it is not political, nor yet just, to condemn such advertisements as offer simply an announcement of change of residence, or of days of business, or of readiness on the part of the advertiser to assist other Dentists in mechanical work.

The advocates for the entire abolition of advertisements build their arguments on the practice of the Medical Profession. But the parallel between us and Medicine is not perfect : for Medical men do not, on the one hand, require advertisement in the same mode and for the same reason as we do ; and, on the other hand, Medical men have ready means of advertising, which they largely avail themselves of, and which we have not. Let us explain. When a Medical Practitioner settles himself down in a locality to practise, he takes a central position there, is soon known to everybody, is able to find sufficient labour for his hands in his immediate circle, and requires no kind of advertisement, beyond his skill and character, to make him known.

In populous places this same position may be said to extend to the Dentist: but in small places, where there is not scope for a Dentist at all times—or where there is scope, but in which the duties of a Dentist considered as special duties are quite new, and until made known are unrecognised—personal attendance is not alone sufficient. The Dentist who, fully qualified and honest in his Profession, goes at particular times to small neighbourhoods to exercise his art, does no dishonourable act, but confers, rather, a service on the community; the man, again, who, selecting a populous town for his residence, opens there a practice which to the mass of the people is a novelty, does nothing dishonourable; but to both these men, as it seems to us, fair advertisements are essential: to the former, that his days and hours of visit may be intelligible; to the latter, that his special labours may be announced and rendered understandable to all who may be benefited by them. Again, there are men who, upon entering into life, may be very good men—educated, sensible, and without touch of moral delinquency. These must commence their careers in some way: they cannot, as a general rule, commence on their own account altogether; but they can commence, if they will undertake to assist their seniors in the Profession. To these, again, advertisement is necessary; for without such means of publication they have no possibility of making known their wishes and requirements.

So, we see that there are, in essential respects, differences between the Dentist and the Medical man, demanding different means for getting introduction into practice. And then, as we have said before, there is another distinction—viz., that the Medical man has a command of advertisement which the Dentist has not. This point is one of great importance, and cannot be too fully enforced.

When a Medical man has made his way to qualification, he finds before him a great science so uncertain as yet in its action, that let him turn his eye where he will, he discovers wide scope for his industry and his knowledge: he can investigate, tabulate, theorise, record. The result is, that on such exertions he can legitimately frame a work for the press; and such work once framed and executed, *What is it in regard to practice but a great advertisement?* The book itself is an advertisement; but this is not all, for the book is advertised, extracts from reviews are appended, and the name of the author, in the columns of the weekly and daily papers, is just as broadly circulated as if his address and hours of consultation were put in the place of the prominent notice of the book.

In the case of the Dentist, however, the positions are widely different. We do not say that Dental Science and Art are perfect; but it must be admitted withal, that a man entering into our Profession, and learning all of it that is known, finds that he can turn to very few points for materials out of which to produce a good and creditable book. In a word, we may safely say, that the method of getting practice fairly and honestly by book advertisement, as it is so thoroughly carried out in Medicine, is an impossible procedure when applied to our own Professional body.

With these facts before us, it remains, we think, a logical sequence, that under particular circumstances a modest form of advertisement, in which nothing false or fraudulent is stated, is at once an allowable and even necessary procedure.

And now there comes over this argument another thought, and we ask their mightinesses in Dentistry particularly to consider it, for it affects them seriously and in proportion to their mightiness. Suppose their law to be allowed to stand good; suppose all middle-class mere business advertisements are done away with in respectable Dental society; suppose the College of Surgeons, the College of Dentists, and the Odontological Society were to lay their serene heads together and say, "Whoever advertises is none of us." Under such conditions, who will profit? We will answer. Under such rule, the most flagrant quack would profit most; under such rule, every discarded man would, in self-defence, become an advertiser, and finding that the more he advertises the better his chance, would thank the Colleges that in forcing him into so much liberty, they had forced him into fortune.

And here again, bearing on this question of Dental advertising, is another point, on which if we take Medicine too far as a guide, there is danger of stumbling. The bare advertising unqualified quack in Physic is by necessity an impostor, and is not, therefore, in the end, capable of inflicting serious injury on the qualified man. But, in Dentistry, the most flagrant advertiser need not of necessity, in so far as his skill is concerned, be an impostor. It is notorious, for example—and there is no good in concealing it from ourselves—that one or two of the gross advertising Dental firms do not only turn out excellent work, but, by the lowness of the terms at which they profess to work, do attract to their consulting-rooms the very highest of the land, and abstract from the stricter members of the legitimate part of the Profession the fees to which they are entitled.

We must not, in relating these facts, be misunderstood. We do not say that the advertising system is to be permitted without licence. We would only suggest, whether by driving what may seem necessary advertisements out of the field, we do not encourage the growth of other advertisements, which, not necessary, and not creditable, are nevertheless very largely and unmistakeably successful.

THE 'Lancet,' since our last impression, has thought it proper to renew the attack on the College of Dentists. We see nothing whatever new in these later attacks, and nothing deserving of more credit than in the previous articles.

The great fact of the labours of the College is, of course, scrupulously ignored; a further quibble is made upon the word "constituted," as used, and very properly used, by Mr Waite, and a peevish objection to independency of action is grounded on the suggestion that all that can be done for the Profession is accomplised on the merits of the Dental Certificate of the College of Surgeons.

So far, then, the real argumentative strain of the 'Lancet' is harmless: but there is another point introduced into its columns which is less harmless, because it is unjust. In one of the articles, it prints a list of names of gentlemen who belong to the College of Dentists, and who also advertise. In this list the names of some four persons who advertise contrary to the laws of the College, and whose cases are, we believe, now before the Council, are mixed up with the names of others whose advertisements, according to the rules of the College, are not in any way objectionable.

To show the animus of the writer in the 'Lancet,' we may add the singular fact, that whereas he has raked up the names of every gentleman who advertises, and who is simply a Member of the College of Dentists, he has omitted to carry out this rule in very case where the advertiser possesses also the Certificate of the College of Surgeons. The reticence of the 'Lancet' is thus made to convey to its readers that the possession of the Dental Certificate has proved practically the cure for Dentist advertising; while the real fact is, that one of the most flagrant advertisers in the Metropolis bases his connection with Dentistry on the possession of this very Certificate, while others similarly qualified advertise in a less ostensible but systematic style.

We have so fully discussed the question of advertising in the preceding article, that we need not re-enter on it here; but we would beg to suggest to the Executive of the College of Dentists not to be led away by any taunts or insults from the calm consideration of the great question before it. The College, in its original constitution, was necessarily free in its laws: steadily it has become more exacting, and the result has been good, for advertisers have, in obedience to its rules, in a vast number of examples, given up the practice. This is true and liberal reform; and if at this early period it has not been entirely successful, it will be in the end.

Let those who are without sin cast the first stone! This grand recommendation, acted on a little more freely, would be a very effective remedy for much of the ill-feeling existing amongst us at the present moment.

A Correspondent, writing to us on the Advertising question, suggests that we print a carefully-compiled and authenticated list of every advertisement that has been put forth by every living Dentist. The list certainly would be a startling fact; and if we do publish it, will indicate that many who, under the treacherous protection of time, are bold in condemnation of the modern advertiser, were better employed in performing a wholesome penance, in liquidation of past delinquencies.

PROCEEDINGS OF DENTAL SOCIETIES.

THE AMERICAN DENTAL CONVENTION.

Through the considerate kindness of our much-esteemed Correspondent in Philadelphia, we are enabled thus early to give a full report of the Meetings of the American Dental Convention, held at New Haven, U.S., on Tuesday, August 6th, and three following days.

Our best thanks are due to our Correspondent for the valuable information comprised in the parcel of numbers of the 'Connecticut Herald and Weekly Journal,' from whence our report is taken.

We cannot but congratulate our brethren in America on the public spirit evinced by them in securing so satisfactory a Convention as that recorded, notwithstanding their national troubles.

We shall take an early opportunity of commenting further on some of the events of the Convention, especially in regard to the proposed World's Dental Meeting of 1862.

FIRST DAY—MORNING SESSION.

The seventh annual session of this Association opened in Music Hall, on Tuesday, August 6th. The meeting was called to order by the President, Dr T. L. Buckingham, of Philadelphia, at 10¾ o'clock. The number in attendance was large, and represented the Profession in nearly all of our principal cities.

The minutes of the last meeting, held in Saratoga, were read by the Recording Secretary, Dr B. W. Franklin, of New York City, and were approved.

The Convention proceeded to the election of officers for the present year.

Dr J. Allen, of New York City, was elected President.

On motion of Dr Rogers, it was voted that in the afternoon session the members' names be called, and they take their seats on the side of the Hall, at the President's left.

Adjourned till 3 o'clock.

FIRST DAY—AFTERNOON SESSION.

The President called the meeting to order at 3 o'clock, and the balloting for officers was resumed. For Vice-President, Dr J. D. White, of Philadelphia, was elected. Dr F. Searle, of Springfield, Mass., was elected Recording Secretary; and Dr B. T. Whitney, of Buffalo, N. Y., Corresponding Secretary. Dr John T. Metcalf, of New Haven, was elected Treasurer.

The next business in order being the address from the retiring President, Dr Buckingham, that gentleman remarked that such an address was eminently proper, and should be required; but he was nevertheless going to request that he be excused from any address, as he had none prepared. He referred to the uncertainty for some time, owing to the distracted state of the country, whether there would be a meeting: and since the question was decided, there has not been time in which to prepare such an address. He was glad the two Secretaries had succeeded in holding the meeting, and was convinced more and more, the longer he saw the Association in progress, of their final success. The old American Association, where the whole work was done by the few, and the meetings were so controlled, was a failure. An institution like this, where all is free and open to every one, becomes a necessity. True, some rules for government are necessary; but let all else be as free as possible.

Drs Rogers and Wetherbee were appointed a Committee to conduct the President Elect to the chair. Dr Rogers said, "It is said that republics are ungrateful;" but surely this cannot be true of the Dental Convention, for they have called the man who stands first in Mechanical Dentistry in the country to preside over them. I introduce to you Dr J. Allen, of New York."

On taking the chair, Dr A. expressed his thanks for the honour conferred, and his wish that it had fallen on some one more capable. He said, since he was there, all he was or could do should be theirs. He had seen many changes in his life, yet none like the one now agitating the country. Still, he could not but congratulate the Association upon their appearance, even considering the absence of their brethren from the South.

The other officers elect came forward and took their seats.

On motion of Dr Hurd, it was voted that the Executive Committee make a report of the order of business and subjects for discussion previous to the final adjournment.

On motion of Dr Wetherbee, it was voted that Dr W. Hooker, of the Medical College, and other medical gentlemen of this city, be invited to seats upon this floor.

Dr W. H. Atkinson of Cleveland, O. G. T. Barker of Philadelphia, W. B. Roberts of New York, I. J. Wetherbee of Boston, and Samuel Mallett of New Haven, were appointed by the President as the Executive Committee.

Dr Barker moved that the several Dental journals be furnished with a copy of the Report of the Executive Committee, with the request that they will give said report an insertion in each number during the ensuing year. Seconded and carried.

Dr Wetherbee moved the appointment of a Committee of three to revise the Constitution. After an amendment by Dr Buckingham that the Committee report before the final adjournment, the motion was carried.

The President called for essays or remarks upon the first subject for discussion, Etiquette considered—1st, in "Fraternal relations and courtesies among Dentists and with Physicians;" and 2nd, in "Intercourse with patients and the public relating to neighbouring practitioners and their operations."

Dr Whitney said he would say a few words just to set the ball in motion. He considered this subject of all others the most important for the Dentist. Other matters relating to his manipulations can be read about in books, but this is not so to be learned. For twenty years he had been in Dentistry. When he commenced, things were far different from what they now are. Every member of the Profession then wore his mantle of secrecy, and all the knowledge he got he locked up in his own bosom. In all these matters we should impart our knowledge—tell all we can that can benefit others. By a narrow-minded course, we not only lose our own respect, but that of our patients, and expose ourselves to being considered charlatans and quacks. We owe the kindred, or more properly the mother, Profession much, and we should always cultivate the most friendly feelings towards them.

Dr W. H. Atkinson, of Cleveland, O., thought the whole matter of Etiquette was a personal matter. Every man of experience in any profession knows how sore a point Etiquette has always been. The honest man—and all are such at the commencement of their Profession—inquires what is this Etiquette? Does he always see it in his elders? Do we even know exactly what it is? Does not every individual put his own interpretation upon it, varying from it according to the influences surrounding him? The golden rule is the only true one to go by in all cases. The man of scientific knowledge too often shuts up what he has gained within himself, and resolves that it shall die with him. It is not right to do so. We must acknowledge that all we have comes from the great Father of all, for the benefit of the race. Every man is a brother—some of them, perhaps, dirty, needing to be washed; but are our hands clean enough to wash them? Till we recognise these general principles, Etiquette is useless. Till we bring them close home to every one of ourselves, and ask, Should I like to have this man do just the thing to me which I propose to do to him? we must fail. He wanted it understood that it is no light thing to make an instrument to affect an immortal man with.—Earnestness is essential for any good result. Be earnest and honest, and you are sure of success. Any old, hardened sinner can be reached by approaching him with simplicity and innocence.

On motion of Dr Mallett, Dr Worthington Hooker was invited to address the Convention.

He expressed the great pleasure it gave him to meet the gentlemen present, not so much because of the connection between their Professions, as from the very pleasant intercourse he had had with some of its members. He had been in consultation with Dr Mallett that very afternoon, administering ether. Were it relevant to the subjeet, he could give his experience in the mode of administering this anæsthetic. He would, however, *etherise* the subject in hand before proceeding to the other. Upon being requested to give his views, he said he hoped he should not carry the application so far as to put his audience asleep, as he was not of the opinion that complete insensibility was required. There was a period, as he had proved by experiments upon himself, when sensation was lost without a loss of consciousness. There are three stages: a first, where sensation is blunted; a second, where there is a slight derangement; and a third, of complete insensibility. To return to the subject of Etiquette, I do not believe the golden rule is capable of doing the whole matter; for a man may carry out this rule and yet transgress the rules of Etiquette—may trespass on the courtesy due to the sister Profession. Suppose in a neuralgia case the physician is called, and gives his opinion that the teeth are no cause of it. Then the Dentist is visited, and he says the teeth are the cause. In this he does wrong; for he should ascertain if a physician has been consulted, and then advise with him. And the physician should do the same. The rights of both will thus be maintained, and their intercourse be more pleasant than it often is. Mere thoughtlessness leads frequently to a want of courtesy. There are men in all Professions who know too much. He went to a Dentist once who flooded him with knowledge, saying he could determine the effect of ether upon any person at sight! Not that he was opposed to knowledge; let us know all we can, but admit that others know something as well as ourselves.

Dr J. J. Wetherbee, of Boston, endorsed the views of Dr Hooker upon the desirableness of intercourse. He thought we ought not to be jealous of each other. If we are gentlemen, and study the rights of each other, we shall discover a relationship between us which is alike grand and firmly cementing. He had longed for the time when they should be more fully acknowledged as a sisterhood of the Medical Profession—he believed a twin sister. They have claims upon us, and we upon them, which cannot be disposed of. Let us admit these claims, and thereby spread further and wider our usefulness. Let us make it apparent to the community that we are masters of our Profession. Then, starting from this point, when we meet a brother Dentist who has not had all the advantages which we have enjoyed, let us not treat him coldly and say, "Stand thou there; my knowledge is greater than thine." No; every man who has knowledge, I think, ought to communicate it. This has been my theory, and I have tried to make it my practice. I am willing to suggest to any brother in the Profession any improvement I know. I cannot myself do all the work in the country; and if I give information to my fellow Dentist, I make him a better practitioner in the community. We can thus aid ourselves very materially. I speak now of honest men, and not of quacks. We are ever to guard the Profession with a jealous eye, and by all the means in our power. Dr W. closed by an earnest appeal to the members to fraternise with the Medical Profession, and illustrated it from instructive examples in his own experience.

On motion, adjourned to Wednesday at 9 a.m.

SECOND DAY—WEDNESDAY MORNING SESSION.

After a half-hour spent in the examination of models, &c., the Convention was called to order at half-past nine by the President, Dr J. Allen.

The Secretary read the minutes of the last session. On motion, they were approved.

The following letter from the London College of Dentistry was read and approved:—

"College of Dentists, England,
"5 Cavendish square, London, July 9, 1861.

"To Professor T. L. Buckingham.

"Dear Sir,—The subject of the proposed 'World's Dental Convention' has been brought under the notice of the Council of this College, and we are requested to communicate to you, as President of the American Dental Convention for the current year, that in the event of the General Convention being held in London during the Great International Exhibition of 1862, the College of Dentists will deem it an honour to welcome their Professional brethren from America, whose enlightened labours have tended so much to secure for the Profession of Dental Surgery a distinguished scientific position in their own country, and have proved a noble example to the Dentists of other countries.

"The Council had hoped that the College of Dentists might be made available for the great meetings of the Convention; but inasmuch as the

Profession in England is so divided, it appears desirable that a *neutral ground* should be chosen for this purpose. Thus both sections of English Dentists might unite to welcome their brethren from distant lands.

"We have the honour to remain, dear Sir, with much respect, your faithful servants,

(Signed) "GEORGE WAITE, M.R.C.S., President.
"SAMUEL LEE RYMER, } Hon. Secretaries."
"ANTHONY HOCKLEY, }

On motion of Dr Franklin, it was accepted and ordered to be incorporated in the minutes of the meeting.

On motion of Dr Buckingham, a Committee was appointed—consisting of Drs Buckingham, Wetherbee, and M'Ilroy—to take into consideration the letter, advise any action they may think expedient, and report at to-morrow's sitting.

The discussion on Professional Etiquette was resumed.

Dr Hurd, of Williamsburgh, considered yesterday's remarks to the point, and we have all no doubt been profited by them. But this subject is so extensive and far-reaching, that we have yet but crossed the threshold. It extends beyond the simple profession alone, and requires them to come down from their lofty eminences and consult with those they may consider their inferiors. But who of us has not been inferior and imperfect? This should be no bar to intercourse; for any man, however imperfect, if he is honestly striving to build himself up, is entitled to the respect of every member of the Profession. Etiquette goes even further, and requires silence upon the faults of others; it prevents criticism in public upon a brother's reading, or even spelling. "I had rather," said he, "bless my own soul by a good act towards an enemy, than to curse his soul by an ill-timed remark."

Dr Searle wished to make a single suggestion relating to the intercourse with the physician. The time was, not a great while since, when Medical men looked upon Dentists as mere mechanical operators, and hence denied them their confidence and respect. A new class of men is coming up; and to these we can give advice, and so exert an influence for good.

Dr Allen requested Dr White to take the chair; and he then read a paper upon the "Causes which retard the progress of Dentistry." One of the foremost was the dislike of many to advance on untried ground. They are afraid to venture beyond their predecessors, though all they do is faithfully done, and many such have left honourable memorials. Many others venture on a little way, and then turn back, thinking, had the subject they are engaged in been so important as they think, some other person would have long before done it. Again, it is thought by some that the Profession is not remunerative enough. This begets apathy, and apathy destroys efficiency. This for two reasons: 1st, because it retards and hinders progress; and 2nd, because the community requires our best services. Another class are good practitioners who do not aid in the advance, because, seeing the difficulties before reaching the result, are unwilling to make the effort to secure it without remuneration. Men's acts live after them. Let us see that we have some good results from the part we have taken in this life.

Dr Jarvis, of New York, considered this subject of intercourse of immense importance, not only to both Professions, but to the public. Let us lay down some rule by which we might govern our action in this intercourse. The golden rule is an excellent one for most circumstances, but there are cases it will not suit. It may be thought preposterous to think of superseding it, but other rules must obtain. Let the Dentist make this his rule, and never depart from it: First—Kindness, uniform and never to be forgotten. Second—Justice, though the heavens fall. If there be blame, and justice to others requires us to show it, never hesitate to do so. Tell the patient never to throw the blame on the Dentist, till he has followed his instructions and taken proper care of his teeth. Never convey the impression, fault is in the Dentist when it belongs to the patient. Do it in kindness, but do it in justice as a requirement of the Profession.

Dr Stockton, of Trenton, N.J., said, as one of the younger members of the Convention, he had always found the older members of the Profession ready to give all wished-for information. He felt toward some gentlemen present as a child towards a father, so many and varied had been their kindness. He could say in the promise of Holy Writ: "They who sow plenteously shall reap plenteously." Many whom they have enlightened shall rise up and call them blessed.

The second division, Surgical Dentistry, was then taken up, and the first subject, "Ulceration of the Deciduous Teeth, its effects upon the growth and health of the permanent ones," opened for discussion.

Dr J. D. White, upon request, said it would perhaps be better to understand whether the ulceration was that of the crown or the root of the tooth. The ulceration of the roots of deciduous teeth is not always regarded as injurious to the development of the permanent teeth. The presence of an ulcerated deciduous tooth is of advantage to the permanent teeth, as it preserves the flow of blood through the part. He never removes such a tooth except upon the direst necessity. People in America are desirous of getting rid of their teeth too early. It used to be thought necessary to remove the first teeth out of the way as soon as possible. Immense damage has been so done. The young practitioner is apt to act from present appearances. He has no business to operate where he cannot with all human probability determine the result. Dr W. had frequently cut off the roots of these deciduous teeth where they had ulcerated and protruded through the gums. If the root is healthy, it will be absorbed; but not if it is necrosed. The gum will close often over the fang.

Dr Atkinson said, the dear children were mutilated every day in our futile efforts for their good, by attempts to rush in where "an angel would hardly dare to tread." He knew that we extracted too many children's teeth. Let not the Dentist do for the children of others what he would not do for his own. If parents would only take care of the deciduous teeth, the Dentist would not have much to do. What is commonly called ulceration, is only an effort of Nature to get rid of an unnecessary matter—broken-down tissue.

Dr Butler, of Cleveland, wished to say a few words about the amputation of fangs. The greatest cause of disturbance in these little organs is the death of the pulp. The ulceration comes from inflammation, beginning at the fang and increasing till the fangs come through.

Dr Wetherbee asked whether the question included the effect on parents of children's ulcerated deciduous teeth. Parents will require the removal of such teeth against the advice of the Dentist. It is malpractice, and should be abandoned. Money is no equivalent for malpractice; and if this is all the Dentist strives for, the sooner we drop our instruments and retire from the Profession, the better for the world.

The discussion was continued up to near the hour for adjournment, by Drs Franklin, Priest, Woolworth, Buckingham, Whitney, Roberts, Palmer, and others.

Drs Wetherbee, Whitney, and Rogers were appointed a Committee on the Constitution.

Communications were received from Dr Charles Hooker, inviting the Convention to visit the Medical College; also from Mr Herrick, extending an invitation to the members to visit the College buildings.

On motion, it was voted to return the thanks of the Convention to these gentlemen, and that the Secretary be instructed to communicate the vote.

Adjourned at 12½ o'clock, to meet at 3 p.m.

SECOND DAY—WEDNESDAY AFTERNOON SESSION.

The Convention came to order, at the call of the President, at three o'clock.

The second subject in Surgical Dentistry, "Inflammatory Diseases of the Gums and Periosteum, producing absorption of the sockets and loosening of the teeth—causes and treatment," was passed over, and the third, "Bleaching Teeth when discoloured from loss of vitality—means for preventing their discolouration and ulceration," was thrown open for discussion.

Dr J. D. White said he would say a few words, just to make a target for others to fire at. He thought that teeth were not discoloured by a loss of vitality. Dead teeth become discoloured afterwards. The tooth itself does not die, but only the pulp. A tooth becomes discoloured after the pulp is dead from the fluids of the mouth, &c. This colour, he believed, was not due to an infiltration of blood. The red colour does not come from hæmatine from the disintegration of blood-corpuscles. As to the means for preventing discolouration, none in particular can be recommended, except to keep the tooth from any farther injury while treating it. Teeth may be discoloured from a blow. The bleaching process by Labarraque's solution is decidedly deleterious. A tooth immersed in it twenty-four hours becomes white, but its texture is destroyed, and it becomes very rapidly discoloured afterwards.

Dr Barker regretted that he could not agree in all Dr W. had said, that the discolouration was not due to the disintegration of the blood-corpuscles, because teeth are not discoloured out of the mouth. There is going on constantly in the tooth endosmose and exosmose, the fluids passing in and out of the tubuli. The process of disintegration is ever going on. He had some experience in bleaching, and thought the first thing to be done was to bring the pulp to a healthy condition. The experiment was tried on one of his own teeth, in which the pulp had died. It was opened thoroughly, treated with creosote, and afterwards filled with gold throughout. It always felt like a foreign body; and after four years of use, the filling was removed and the tooth bleached. Four parts of prepared chalk and one of chloride of lime were used, and a small quantity introduced twice a day. So the tooth was nearly restored, and no one not a Dentist would detect it. The colour of a tooth, in his opinion, can never be restored perfectly.

Dr Atkinson said the subject of bleaching required a vast deal of knowledge of the laws of chemical equivalency. Colour is not an entity, but an arrested fractional part of light. To bleach a tooth, the whole decayed mass, hard or soft, must be removed. Chlorine is the great bleaching agent, and when used, it must be so combined as to produce its least deleterious effects. For this purpose he used the *undeliquesced* chloride of zinc, crowded into the cavity of the tooth.

Dr Barker asked Dr A. if chloride of zinc was a bleaching agent, or had such properties?

Dr Atkinson replied that he was misunderstood; that he expressly stated that chlorine was the bleaching agent; and that the chloride of zinc, when introduced into the tooth *undeliquesced*, absorbed water from the mouth, becoming liquid, and thereby the chlorine was liberated to effect its bleaching.

On the motion of Dr Wetherbee, Professor G. F. Barker was requested to give his views on the chemistry of the subject of bleaching. He stated that while it is true that chlorine is the great bleacher, it is quite doubtful whether this action is due to the chlorine itself, since it will not bleach except in presence of moisture. In this case, where water is present, the chlorine unites with the hydrogen, setting free the oxygen, which in a nascent state—as ozone, perhaps—effects the bleaching. Moreover, the active agent in both the chlorides of lime and soda (the last Labarraque's solution) is not chlorine, as such, but hypochlorous acid, which acid is set free from combination by any other acid, even the carbonic from the atmosphere. In the chloride of zinc—which is a *binary* compound, while the others named are ternary—no such action can take place: and he contended that the simple deliquescence of this salt—its passage from a solid to a liquid state—could not, in the nature of things, decompose the salt and set free the chlorine for bleaching. "This is not my opinion," he concluded, "but the fact. I have *no opinion* on the subject."

Dr Butler asked to what the influence of chloride of zinc was owing, as he had noticed its beneficial effects in whitening teeth?

Professor Barker replied that whatever virtue there was in this substance to whiten, was due rather to the salt as a whole than to either of its constituents. His impression was that it acted physically in presenting a white ground in the tooth, and perhaps assisted to soften and remove animal colouring matters.

Dr Hayes (Buffalo) stated that after trying various things as bleachers, he had at last returned to the old plan. He opened and scraped the tooth thoroughly, which removed most of the colouring matter, and then filled with gold.

Dr Wetherbee had for ten years entirely laid aside all bleaching agents. He removed, first, all decayed matter, and scraped the whole inside of the fang; cut away all of the tooth, and even contiguous bone that was dead; then filled the entire tooth solid. Teeth well filled will often return nearly to their natural colour.

A discussion took place between Drs Atkinson, White, Wetherbee, and Barker, as to the structure of the tooth and the existence of cementum in its interior. Dr A. contended that there was no cementum in the tooth, but only upon the outside of the fang, from his own microscopic examination; while Dr Wetherbee cited Fox and Hunter to prove cementum was in the interior. It acted there as a nerve cushion.

Dr J. D. White stated, that from drawings made from actual specimens made when he was microscopist to the old American Dental Society, the structure of a front incisor resembled a clam; there being two thin plates of enamel lined with dentine, having a membrane on its interior surface, and a large cavity filled with pulp. There is a crack along the cutting edge of every tooth. To prove that this was not accidental, he examined teeth before their protrusion above the gum, and found it true of these.

Dr Barker considered cementum an improper name for the secondary dentine, for their structure is different. Enamel contained less organic matter than dentine, and this less than the cementum. Cementum approaches the structure of bone, having Haversian canals, canaliculi with lacunæ, as is seen under the microscope. To these lacunæ the blood is carried, and there the nutrition takes place, which is extra-vascular. Under the microscope, secondary dentine has none of the characteristics of cementum.

Dr White stated that the best practice was to open and clean out the tooth thoroughly, and let it remain open to the air and light. Keep it exceedingly dry, as then it lightens more rapidly. This is better than bleaching.

Dr Palmer in his practice had abandoned bleaching agents. He cleaned out the tooth well, and if very much discoloured, took everything out he could. He then put in some white lint or flax, and filled it solid with gold. He thus gets as good a colour as is necessary.

The Committee on Constitution made a report through the Chairman, Dr Wetherbee. It was accepted, and the Committee thanked for their promptness.

The Executive Committee reported, through W. H. Atkinson, Chairman, the programme, which was recommitted.

Adjourned at 5½ to Thursday, at 9 a.m.

THIRD DAY—THURSDAY MORNING.

The Convention assembled, and considered various inventions for Dental purposes, for an hour.

At 10 o'clock the President called the Convention to order.

The minutes of the last meeting were read and approved. The new Constitution was adopted, and the old one nullified.

The Committee to whom was referred the letter from the College of Dentists of England reported through Dr M'Ilroy.

Objection being made that the recognition of the disturbed state of the country appeared to interfere too largely in controlling the action of the Convention in appointing delegates, the report was referred back to the Committee on motion of Dr Barker.

Drs Hayes, Rogers, and Franklin were added to the Committee.

On motion of Dr Roberts, the place of the next meeting was taken up for discussion. After much time consumed in deliberation, Trenton Falls, N.Y., was determined upon; the Convention to assemble there on the second Tuesday in August, 1862.

The Executive Committee reported back the order of business for the next meeting as follows:

1st.—Admission of Members.
2nd.—Reading Minutes of the last Convention.
3rd.—Report of Officers and Committees.
4th.—Election of Officers.
5th.—Retiring President's Address.
6th.—Induction of Officers.

All essays shall be read to open the discussion on the subjects to which they relate.

No member shall speak more than ten minutes, nor more than twice on the same subject without permission.

I.—*Miscellaneous Subjects.*

1. Anæsthetics. Their use and relative value.
2. Alveolar Abscess.
3. The Causes influencing an Abnormal Development of the Teeth.

II.—*Operative Dentistry.*

1. Filling Teeth. Simple and complicated Cavities.
2. The Dental Pulp. Its varied treatment.
3. The Extraction of Teeth.

III.—*Mechanical Dentistry.*

1. Artificial Dentures. Temporary and Permanent.

IV.—*Unfinished Business.*

N.B.—The Executive Committee suggest that half an hour every morning be devoted to the presentation of models, improvements, and inventions, and the disposal of business not embodied in the regular order.

On motion of Dr Buckingham, it was voted to invite Dr Atkinson to read his papers.

Dr A. proceeded to read two; the first, headed "What lack I yet?" being a communication he was *impressed* to deliver before leaving home. The second, highly metaphysical, and, we thought, scientifically inaccurate, was upon the question, "Does being imply the right to live?"

On motion, the Convention adjourned to 3 p.m.

THIRD DAY—THURSDAY AFTERNOON SESSION.

The President called the Convention to order at 3 o'clock.

An invitation was received from Prof. B. Silliman, jun., for the gentlemen of the Convention to visit the buildings and laboratory of the Sheffield Scientific School. Accepted, and the thanks of the Convention returned.

Dr Perine moved that before the meeting adjourned, a certain time be allotted to discuss the propriety of appointing Dentists in the Army and Navy.

The next subject in order,—"Filling Teeth and Roots; what is gained by Fang-Filling, and average of success,"—was then taken up for discussion.

Dr Asay described the method employed by him, differing not materially from the usual one.

Dr White would say a few words upon the question, "What is gained by fang-filling?" We gain a great deal, in so far as metal well packed will shut out the gases and fluids which decompose and injure the teeth. We gain the enclosing of a space which is a receptacle of fluids, which penetrate the pulp cavity. The fluids of the blood do circulate in the nerve cavity, and supply nutrition. If the tooth be filled solidly, we shut out the possibility of treatment by the removal of the filling afterward. Do not plug the tooth directly after removing the pulp. Wait until anastomosis takes place, until the blood can be carried back by the blood-vessels without becoming sensitive. Then plug the root, and afterward the crown tightly. To treat an abscess is only to put it in a condition to get well. Dr Asay had said, when the gum appeared well externally he filled the tooth. He did not himself do this. If the parts appear well externally, it is no evidence that there is no internal disease. It is not a good sign for the gum to heal up, where an abscess has broken through, when the plug is out. When all the parts inside and out appear well, then fill the tooth. A place must be left for effusion to take place, so long as it continues ; so just before the gum is closed the root is to be filled solidly.

Dr Barker said, that in considering this subject he would make a foundation by taking, as an example, a tooth where the pulp was exposed. What is the nature of the inflammation at the end of the fang ? Does cicatrisation, or granulation, or ulceration ensue ? A large amount of blood is thrown to the periosteum, and one of these must take place. He thought it an erroneous practice to extract the pulp immediately after destroying the nerve, and then immediately to fill the tooth, though it is sometimes successful. His custom was to plug with cotton, and leave it a week. If there is inflammation, then it can be successfully treated. But if it is plugged hard directly, there is difficulty in getting at the inflammation, and frequently a loss of the teeth.

Dr Wetherbee considered fang-filling the most important work of the Dentist. This work must be ever the best evidence of his ability. He took issue with the last speaker in regard to the propriety of leaving the tooth plugged with cotton. After applying nerve paste—creosote, arsenic, morphia, &c.—to kill the nerve, then he removed the pulp and nerve, and secured the cessation of bleeding by applying creosote. He filled it directly, and would not be hired to delay it for a single day. Success has taught him that his method is right. Other practice he had seen to be bad in its results. We must be controlled by the pathological condition of the patient, and take great care that he does not take cold. He related several interesting cases in his own practice to show the advantages of immediate filling — one where two teeth ulcerated and loose were cleansed with creosote and filled when they became sound. Perhaps this result would not have taken place in a man forty or fifty years old, but in this case youth was on his side. It is of immense advantage to retain a tooth ; the value cannot be computed of filling well a tooth, inasmuch as the natural is a thousand-fold better than the artificial organ. We should gather every item of experience to help us.

Dr Perine, of New York, considered that in this subject each and every operator should adopt an eclectic practice in order to success. Any man among us, however able, taking a certain number of cases must fail in some. He had one case, which was very bad, of two ulcerated molars. One he cleaned thoroughly and filled. He tried to save the second one by treatment with creosote. When it appeared healthy, he filled it. Some weeks after the patient called with much pain in his tooth. He removed the filling, found some unhealthy matter, and a discharge through the fang. He cleansed and filled it, but not long after was compelled to remove it again. He thought Dentists could not tell how many teeth they lose. They lost far more than they were aware of, perhaps well-filled teeth too.

Dr Roberts considered that when a tooth is diseased and the nerve is dead, it can never become healthy again. It may last, but there is more or less soreness in it—not enough, perhaps, to annoy the patient, but it doesn't feel natural. When the nerve is destroyed, fill every tooth to the apex of the root. In many cases we fail to fill to the apex, when we honestly think we do it. In molars this is more often the case. The Dentist must take many things into consideration, especially the constitution of the patient. A tooth which can be treated in one person's mouth by filling the nerve, and filling directly to the apex, may fail in the mouth of another. Some people even never have the toothache, and their teeth rot out without giving them trouble. He may try his best, but the Dentist cannot save every tooth that comes to him. The best operators may fail from circumstances entirely beyond their control.

Dr Tefft, of Vermont, stated that he had not been in the habit of fang-filling until two years since. A lady came into his office with two front incisors troubling her. He preferred not to touch them; two weeks after she came back with them ulcerated and discharging. He commenced using creosote on a thread, and laying bare the interior; this was treated with creosote somewhat diluted. He asked Dr White if those having constitutional humours were not the hardest patients to treat.

Dr White replied that this was always governed by the temperament of the patient in the treatment of alveolar abscess or ulceration. Where the disposition and temperament of the patient were inflammatory, he always extracted without hesitation.

Dr Franklin said there seemed to be a wide margin of opinion whether teeth should be filled in the fang or not, or even whether all teeth not tender should be immediately filled. In his opinion, if a definite line of action were pursued in any case, we could obtain more nearly constant results. The fault of failure is oftener with the operator, therefore, than with the method. But he had a word to the patient: Go always to the best Dentist within reach.

Dr Atkinson said there was a great misapprehension here, and in justice to this Profession, which he loved, he must speak of it. Our Profession is yet in its infancy, and we go farther than we know about, and think we know more than we do. If we knew all, and then went to the extent we do, all would be right. If the fang is not inflamed, then it may be filled directly. Dr White is right; we may destroy, exterminate the nerve, then open and clear well out the nerve canal, and proceed to fill. If alveolar abscess sets up, don't take out the filling if it is good; but if bad, remove it. The abscess at the fang may be opened from the outside.

Dr Searle said many of his patients came from the country, and he was obliged to conform to circumstances. In filling a number of teeth, one may be found where the nerve is dead and absent, and has never given any trouble. In all such cases, he put a test filling in, as near to the apex as possible, informing the patient of the condition of things. He never filled a tooth so that he was unable to remove the filling in case of inflammation.

Dr Burras, of New York, read a highly scientific and interesting paper upon "Mastication and the Articulation of Artificial Dentures."

A discussion ensued between Drs Wetherbee and White, relative to the mode of articulating dentures.

On motion, it was voted that when we adjourn, it be to to-morrow at 9.

Drs Atkinson, Perine, and Franklin were appointed a Committee upon the question of appointing Dentists in the Navy and Army.

The Committee on the London Correspondence reported the following letter in answer:—

"New Haven, Ct., August 8th, 1861.

"Messrs WAITE, RYMER, and HOCKLEY, College of Dentists, London.

"Gentlemen—The undersigned, a Committee of the American Dental Convention appointed to reply to your letter addressed to this body, beg leave respectfully to say that the fraternal and cordial spirit of your communication has afforded the Convention the most sincere pleasure, and inspired its members with renewed, and, if possible, higher regard for the Professional brethren in England.

"The Committee are requested to return grateful thanks for the very kind manner in which you have pleased to tender a welcome to American Dentists at the proposed General Convention in 1862, and will be happy to make such response as the circumstances of the future shall allow.

"With the highest esteem, Gentlemen, for yourselves personally, and for the distinguished body you represent, we have the honour to subscribe ourselves,

"Very faithfully and gratefully yours,
(Signed) "T. L. Buckingham, Committee
"I. J. Wetherbee, Am. Dental
"A. M'Ilroy, Association."

On motion of Dr Franklin, it was

Resolved, That the officers of the American Dental Convention extend a cordial invitation to the Dentists throughout the United States, to attend the World's Dental Convention, to be held in London in 1862.

On motion, adjourned to Friday, 9 a.m.

FOURTH DAY—FRIDAY MORNING SESSION.

Half an hour was devoted to the examination of inventions as usual, and at the call of the President the Convention came to order at 9 o'clock.

Minutes of the last meeting were read and approved.

The Committee on "Appointing Dentists in the Army and Navy" reported that the subject appeared to them of so much importance, that they prayed for more time to consider it, or else to be discharged from its further consideration.

On motion of Dr Roberts, Drs J. D. White and I. J. Wetherbee were added to the Committee, and they were given full discretionary powers to correspond with the Departments, &c.

The next subject on the programme, "The various Plastic Materials for Filling Teeth—their Relative or Individual Merits," was then taken up and discussed.

Dr Hill, of Norwalk, considered this a very important matter, affecting too largely the community to be passed by. He hoped the gentlemen would speak upon it.

Dr J. D. White said all such matters required deliberation. There is an article on oxychloride of zinc in the 'Cosmos' reviewed by himself. But he proposed rather to discuss the *morale* than the merits of this substance. Those who have been through the labyrinth are not likely to go back again at the call of any one who has found out something new to them. He had been opposed to the oxychloride. Dr Metcalf, of New Haven, recommended it to him; and amidst so many claims for new things, he was glad to find one the merits of which were set forth modestly. When some professor of chemistry said it would destroy the dentine and the enamel, he filled a tooth with this osteo-plastic, this oxychloride of zinc. He saw it a month after, and there was not the slightest change in the layer of dentine upon the wall of the cavity. Wherever a tooth can be successfully filled with gold, he tried not to lose his faith that it was the best thing. Every man must restrict himself to the particular use the substance is designed for. I would encourage Dentists to take up and try new things.

Dr Wetherbee's faith was not quite so large as Dr White's, for osteo-plastic filling has received with him a pretty severe blow upon its head. Justice to the Profession required him to object to its serious use among

Dentists. He examined a young lady's teeth, where four or five cavities were filled with this material. In five or six months they became very uncomfortable, and at the end of that period three had lost their fillings, the fourth was bad, and the fifth alone remained fair. In a short time the filling of this came out, and a cavity was left three times as large as formerly. Her teeth were of a fair quality, and yet in a year the fillings were all out. The Dentist gave as a reason for filling with this material, that the changes of temperature would render the gold-filling liable to loosen and come out. He assured her that the Dentist was mistaken, and filled it himself with gold. None of it has come out yet. He would not have suffered what she did on lateral incisor for a hundred dollars. The material affected the dentine of the tooth. He had never seen a water-tight filling, and he defied any man to make one, because the substance itself absorbs water. He had repeatedly reddened litmus paper, and even the writing paper in which it was rolled was discoloured from its acid.

Dr Metcalf inquired to what quality in the material Dr W. attributed these effects upon test-paper.

Dr Wetherbee replied, they were due, he supposed, to the oxide of zinc. (Dr W. says he intended to say *chloride*.)

Mr Metcalf said, so far as his knowledge of chemistry went, oxide of zinc exerted no action upon the animal structure. About the chloride he was not as positive; but when those two are combined as oxychloride, the mixture is entirely harmless. It will not, if it is properly made, absorb water. He had frequently used it, and never experienced any difficulty from it.

Dr Whitney asked Professor Barker for some light upon the chemistry of these substances.

Professor Barker replied that whatever of knowledge he possessed on the subject was theoretical more than practical. From the mode of manufacture given in the 'Cosmos,' he should doubt very much such a thorough combination of the oxide and chloride in the manner of preparation indicated, as would entitle the substance to the name "oxychloride." The oxide of zinc is perfectly inert, and would not be injurious as a filling. The chloride is an active agent, zinc hardly neutralising the chlorine more than did hydrogen. Chloride of zinc is the material used as a soldering fluid by brasiers, to dissolve the scale of oxide and render the metal bright for the union of the solder. Judging from its active properties, he thought its action would be decidedly injurious to teeth. From Dr Wetherbee's statement that the osteo-plastic had an acid reaction, he inferred that the mixture was not made in just the proportions to insure no excess of its components.

Dr White said he was probably the first in this country to use oxychloride of zinc. He placed a tooth in a solution of chloride of zinc for three years, and he thought it was rather improved when it came out, though it was sound enough before. If the chloride removes the animal matter, this is what we want to get at. He used to be told that sugar was bad for the teeth; but since he grew older he had seen its falsity, and even had incorporated it in a dentifrice, for the sake of its grit.

Professor Barker stated that, in justice to Dr Metcalf, he ought to state that oxychloride of zinc, if properly made, would not, in his opinion, injure the teeth. He said that he supposed the action of sugar was due to its fermentation, whereby it became converted into acetic acid, which would act on the lime-salts on the bone. The relative hardness of enamel, dentine, cementum, &c., would cause the action of corrosive agents to vary immensely.

Dr Barker said he had noticed that citric and tartaric acids had a remarkable action upon the enamel. When immersed in such a solution, the enamel scales off and floats above the tooth; the action of acetic acid is not as marked.

Dr Mallett entered his protest against the use of all osteo-plastic materials.

Dr Stevens, of New Haven, said that many in the community considered it as rather better than gold for filling. It is even held up by some men in our Profession in too high a place. Dr Metcalf is too honest and straightforward to offer any material which was not in his hands a good one.

Dr Smith stated that he had filled a tooth for one of the proprietors of the 'Journal and Courier' with osteo-plastic, that it had given great satisfaction, so much so that an article was written for the paper recommending it.

Dr Hayes asked Professor Barker if a decomposition could not take place between the oxychloride of zinc and the phosphate of lime in the teeth.

Dr Barker replied that we have no evidence that such a change did occur. But even if it did, the interchange of elements would break up the arrangement, and so disintegrate the tooth.

Dr Buckingham said the composition of these materials was so uncertain, we could not depend at all upon the uniformity of the result. He had experimented in forming osteo-plastic, sometimes getting a substance as hard as stone, and at others it failed entirely to harden, owing to impurities in the oxide of zinc, &c. If the chloride be in excess, the mouth has a constant taste of it. The fluids, too, of the mouth vary, and in some mouths it may be more acted on than in others. He thought free chloride of zinc would destroy the animal tissue and disintegrate the tooth.

The next subject was then taken up—"Hæmorrhage after extracting Teeth, and its Treatment,"—and discussed by Drs Burras, Whitney, Barker, Hill, Woolworth, Wetherbee, Roberts, and others.

On "Miscellaneous Dentistry" Dr Franklin read a poetical paper, setting forth the advantages of Mechanical Dentistry.

Drs White, Atkinson, Metcalf, and Butler spoke upon the material best adapted for killing the nerve. Arsenic, creosote, and iodine were recommended.

Adjourned at 12½ to 2½ p.m.

FOURTH DAY—FRIDAY AFTERNOON SESSION.

The Convention came to order at the call of the Vice-President, Dr J. D. White, at 3 o'clock.

The discussion was resumed upon Mechanical Dentistry, the subject being "Surgical Preparation of the Mouth for Artificial Dentures: Should the roots of broken and decayed teeth always be removed?"

Dr Butler would not always extract the roots of even broken-down teeth. Sometimes a central or lateral incisor is broken down, and the crown may be cut off, but he would not extract the root. On the contrary, molar and bicuspid roots he would remove. He usually cut the incisors down, drilled the canal and plugged the fang. Where it is extracted, it is difficult to put in an artificial piece that should present a good appearance. It is difficult to make the artificial gum look well, but leaving in the incisor fangs will improve the looks.

Dr Roberts thought the question could be answered both by yes and no. He always extracts all the teeth for the insertion of a full set in the upper jaw. Where a single root is firm and will stand filling, perhaps it is better to let it remain and put in a pivot tooth.

Dr Atkinson said this was a principle to be got at through experience. His own had taught him that if he wishes to preserve the shape of the mouth, the fangs had better be left, if they are perfect, down to the edge of the alveolar process. Even if every alternate one was diseased, it would be better to remove these and leave the sound ones. Either in whole or partial sets, never remove healthy fangs. He had not seen as many plates cracked by the protrusion of the fangs, as from the absorption of the gum when the plate was fitted down too soon. The roots afford a firmer support for the muscles.

Dr Sutton could conceive cases where it might be impossible to let healthy fangs remain. In cases where the gum is in a condition to be much exposed, the fang if left might contribute to a better appearance.

Dr Roberts said that no root could be shut up tight under an atmospheric plate, so but the saliva would penetrate it and inflame the periosteum.

Dr Hayes stated a case where he put a plate over two fangs, because he was not allowed to remove them. They have been in use twelve years, and are still firm and perfect.

The next question—"When shall we insert pivot teeth?"—was answered by Dr Franklin: "When we have a perfectly sound, healthy root to operate on, and all the operation can be done comfortably and satisfactorily."

The third question—"The relative merits of the various materials used as a base for artificial dentures, and the method of mounting them,"—was opened by Dr Whitney, who had made for several years silver and gold plates, continuous gum on platina and vulcanite bases. Of all these he preferred vulcanite. One is sure of a good fit every time with it; it is more cleanly, looks more like the natural gum and teeth, there is no twang in the mouth, it does not cost the patient as much, and it yields as large proceeds to the Dentists.

Dr Parmele had himself worn both gold and silver plates, and lastly rubber; and as for wearing more of the latter, he couldn't do it. It produced a nasty, sour, sickening effect in his mouth. A lady of his acquaintance had the same experience.

Dr Roberts concluded that if we were all constituted alike, then Dr Whitney's statement would be true, that rubber was the best thing in use. The Dentist should try to do the best thing by his patients. When properly made, he thought nothing was equal to continuous gum.

Dr Mallett had had some experience in rubber. He made the first rubber plate that was made in the United States. It was some six years ago when he brought forward practically the insertion of teeth on rubber base. This was a year before Putnam, of New York, began and claimed the credit of the invention. His experience proves there is nothing equal to it for inserting artificial dentures.

Dr Hill corroborated the fact that Dr Mallett was the first to use rubber. He saw it at Dr M.'s office for the first time. He regarded it with much favour; though if a person came to him to decide, he would put in the continuous gum as the most beautiful and satisfactory.

Dr Buckingham said that Dr T. W. Evans claimed to have first vulcanised rubber, and to have set teeth on it for Mr Goodyear.

Dr J. Allen, of New York, spoke of his method of constructing under sets in cases where the gum contracts, and by this the fit is lost and much trouble given. The plate is apt to be buoyed up by the gum, &c., by adding a flange around the outside, so that the cheek may rest on it and hold it down most beautifully. So far as his experience went, he had made scarcely any work except platina plate and continuous gum, except for small work, where he prefers gold. His confidence in the gum-work increases. He could not be prevailed on to go back and use anything else. As perfect a fit can be obtained with it as can be possibly obtained.

Dr Franklin considered the relative merits of these materials were due to the amount of good which can be done by the employment of their instrumentality. He thought more could be accomplished with vulcanite than with any other material. The vulcanisation takes place too quickly. The cake is baked too rapidly, and so not done through. The plate must have time to cook through. The thin parts must always be harder than those which are thicker.

Dr White had been waiting for these things to be perfected. He could not condemn or favour them. For the last two or three years he had been looking favourably upon vulcanite, and perhaps will soon have it put up in his office. He could not afford the time, at this period of life, to learn the whole thing himself.

Dr Atkinson said it was the last flame which burns the brightest. He apprehended it was so there, and some of them would get burned. We all have a prejudice against new things, against what we don't know about. For entire dentures he considered the continuous gum on a platina base unparalleled. In the vast majority of cases, vulcanite, its price considered, stands as unparalleled. For under sets he thought nothing so good as rubber. For upper partial sets he preferred gold. For entire sets—"plumpers," as they are termed—he preferred continuous gum, and next rubber.

Dr Allen referred to the admixture of foreign metals with the platina plate from the dies. It should be placed in acid before subjecting it to heat.

Upon the subject, "Miscellaneous Subjects," Dr White remarked that the weight of a set of teeth was not disadvantageous. He had a lady insist to him that her upper set were two heavy, when they stayed up.

Dr Searle had found one case where it was very difficult to get the plate to stay up, even when well fitted. In a previous case he took an impression twice, but could not make it adhere till he made a hole in the air-chamber and covered with an oiled silk valve. But this did not answer in the other case.

Dr Allen said, some plates are fitted over the muscles on the jaw, which in action throw the plate off. Then the patient complains it is too heavy.

Dr Priest had found that in rubber-work, a suction cavity was better away. His plates cannot be sucked out.

Dr Burras called Dr Franklin's attention to a set of teeth which weighed 105 dwts.!

Dr Franklin stated that he doubted whether the man would take them; but so good was the fit, that he said nothing about their weight. He thought temperament was essential to consider. There is a want of adaptation of the material to the patient. There's not a day that we don't see a man with teeth belonging to some one else. Some men, very good operators, buy teeth and use the same sets on all persons from eighteen to seventy-five.

Dr Butler thought that many men could select well who could not arrange well. Others make good plates, but they want somebody else's teeth on them. Is there any rule by which teeth can be properly selected?

Dr Crossett said he came from California rather to be instructed than to speak. He had received benefit sufficient to repay him for coming. When he went to San Francisco, he found them using quartz filling, and everything almost beside. There exists a prejudice against this work, and only two individuals there use continuous gum.

On motion of Dr Whitney, a vote of thanks was given to Professor Barker for the interest he has added to the session.

On motion of Dr Mallett, a vote of thanks was given to the press of the city, especially the 'Journal and Courier,' for the notices they have given of the meetings.

After a few remarks from President Allen, the Convention adjourned *sine die.*

The following gentlemen were present at the Convention:

J. A. Pelton, Middletown; A. H. Brockway, Chittenango, N.Y.; J. B. Snow, Bridgeport; L. Parmele, Hartford; T. H. Burras, New York City; George E. Hayes, Buffalo, N.Y.; J. L. Asay, Philadelphia, Pa.; D. A. Jarvis, New York City; Jos. Beals, Greenfield, Mass.; T. Crossett North, San Juan, Cal.; A. N. Priest, Utica, N.Y.; A. B. Welton, Milford; T. L. Buckingham, Philadelphia, Pa.; I. J. Wetherbee, Boston, Mass.; W. B. Roberts, New York City; W. B. Heard, Brooklyn, N.Y.; A. W. Allen, Norwich; A M‘Ilroy, New York City; James M‘Manus, Hartford; I Woolworth, New Haven; S. S. White, Philadelphia, Pa.; D. H. Porter, Bridgeport; Charles Butler, Cleveland, O.; E. E. Crofoot, Hartford; S. Mapes, Fiskill Landing, N.Y.; C. S. Miles, New York City; W. W. Rice, Great Barrington, Mass.; James Fleming, Harrisburg, Pa.; I. N. Scranton, Bennington, Vt.; L. W. Sutton, Greenport, L. I.; J. M. Nevins, Bucksport, Me.; H. J. Stevens, New Haven; W. S. Bowdoin, Salem, Mass.; A. B. Smith, New Haven; B. F. Whitney, Buffalo, N.Y.; A. Hill, Norwalk; A. Merrit Asay, Philadelphia, Pa.; Thomas Palmer, Fitchburg, Mass.; S. J. W. Neal, Camden, N. J.; C. S. Stockton, Mount Holly, N.Y.; W. W. Clapp, Norwich; L. W. Rogers, Utica, N.Y.; F. Searle, Springfield, Mass.; Samuel Mallett, New Haven; B. W. Franklin, New York City; J. D. White, Philadelphia, Pa.; John Allen, New York City; M. Frank, Cortland, N.Y.; W. W. Starr, Brooklyn, N. Y.; J. H. Smith, New Haven; H. L. Sage, Bridgeport; J. T. Metcalf, New Haven; W. W. Atkinson, Cleveland, O.; George T. Barker, Philadelphia, Pa.; J. R. M‘Curdy, Philadelphia, Pa.; T. D. Evans, New York Mills; J. C. Smithe, Williston, N.Y.; A. Jones, New York City; H. N. Ferise, Rochester, N.Y.; Charles Merrit, Bridgeport; T. S. Scranton, Madison; M. Tefft, West Putney, Vt.; S. G. Henry, Westboro', Mass.; H. F. Smith, Pine Plains, N.Y.; W. H. Allen, New York City; G. H. Perine, New York; W. S. Elliott, Sag Harbour, L. I.; H. M. Miller, Westfield, Mass.—In all, 68.

College of Dentists of England.—The Fifth Annual Session of this College will be opened on Tuesday, October 8th, by a Conversazione. The Monthly Meetings for the reading of Papers will be renewed, and during the Session two Courses of Lectures will be delivered;—one by Mr Hulme, on "Dental Materia Medica and Therapeutics;" the other by Dr Richardson, on "The Condition of the Teeth in various Constitutional Diseases."

Mr Edward Dew, of Weston-super-Mare, was elected a Member of the College of Dentists, at a Meeting of Council, held on Tuesday, August 20th.

Metropolitan School of Dental Science.—The Third Session of this School will commence on Thursday, the 10th of October. During the recess some changes have taken place in the staff of lecturers, and certain alterations have been made in the Lectures on Chemistry and Mechanical Dentistry. The Chemical Course, instead of being limited to three months as heretofore, will this year be continued during the whole session, and will include a series of practical demonstrations given by Mr Tribe, Dr Bernays' able assistant. The Course on Mechanical Dentistry will be delivered by Mr Perkins, in conjunction with Mr Hockley: the addition of the latter gentleman's name to the staff of lecturers will, we are sure, be gratifying to all friends of the School. In consequence of his numerous engagements, and his appointment to the Lectureship on Comparative Anatomy at the Middlesex Hospital, Dr Cobbold has resigned his chair at the Metropolitan School of Dental Science: he is, however, succeeded by Dr Francis Webb, a gentleman whose known ability as a scientific naturalist and as a lecturer render him a worthy successor of the distinguished comparative anatomist who has retired. The appointment of Mr Schofield as Resident Medical Officer to the Camberwell House Asylum has necessarily severed his connection with the School: he is succeeded by Mr Davis as the Demonstrator of Anatomy. One want—that of a School of Practical Operative Dentistry—will, we are happy to say, be supplied, and the only drawback which has hitherto existed to the carrying out of a thorough practical Course of Operative Dentistry will be removed. At the time we are writing, eligible premises have been secured in a leading thoroughfare, and within the immediate neighbourhood of the School, for the purposes of the National Dental Hospital. This establishment will be open and in working order in the early part of October; one of the Dental Officers will be in attendance every day, and an excellent field of practice will be open to those students who may choose to avail themselves of the opportunity afforded them under the regulations which will be decided upon by the Hospital Committee.

CORRESPONDENCE.

TO THE EDITOR OF THE 'DENTAL REVIEW.'

Sir,—In the letter of the 'Lancet' of August 10th, 1861 (the answer to Mr Waite's second communication) which appears in the columns of the 'British Journal of Dental Science' for the present month, allusion is made to my name as one who *still uses advertisements*. Now I beg to contradict such a *false* and *malicious* statement, and should feel obliged if you would make it known in your able Journal that I have long ceased to advertise, it being nearly two years since my name in connection with my Profession appeared in any paper or periodical, being convinced that such a mode of gaining notoriety is utterly opposed to the dignity and honour of the Profession. It would have been more honourable if the writer of that splenetic letter in the 'Lancet' and the Editor of the 'British Journal of Dental Science' had made themselves cognisant of the above facts before they committed themselves by stating an untruth; but I suppose such a mode of proceeding would not have answered their object, which was to swell the list of those Members of the College who still use advertisements.

I remain, Sir, yours truly,
G. Waylin.

Bury St Edmunds, Aug. 23, 1861.

MISCELLANEOUS.

Royal College of Surgeons.—At meetings of the Court of Examiners, held on the 30th and 31st of July, Mr Haslar Harris, of Gower street, Bedford square, and Mr John Thomas Henry West, of Old Broad street, City, Members of the College of Dentists, were admitted Members of the Royal College of Surgeons of England.

Dental Appointment.—Mr John Brock, Member of the College of Dentists, has been appointed Dentist to the Westminster General Dispensary, Gerrard street, Soho.

South Hants Infirmary.—Election of Dentist.—Mr Bromley, of Southampton, who holds the Dental Certificate of the College of Surgeons, has been elected Dentist to the South Hants Infirmary. Mr Payne, a Member of the College of Dentists, gave the following reasons for not qualifying himself to oppose Mr Bromley :—"The rules of the Institution made it imperative that a candidate should possess the diploma of some 'legally-constituted body.' He was afraid that the Governors of the Institution generally did not understand, or were not aware, that there was no 'legally-constituted body,' except the College of Surgeons, that did grant a Dental diploma. Not having obtained a diploma from that body, he (Mr Payne) was ineligible, and therefore had not offered himself as a candidate for the Dental appointment. But he did not think it was right, or proper, or just towards individuals like himself, who was a native of the town, and articled in the town, to make such a condition. He was one of those individuals who signed a document setting forth that in his belief he considered it would be better for the Medical Profession, and for the Dental Profession, as well as for the public generally, if the Dentists were a distinct and separate body; and how could he, after having done that, consistently go to the College of Surgeons and ask for their Dental diploma? He could not do so, because he was backed by the opinion of no less than 3,000 Medical Practitioners throughout England. This was the reason why he did not accept the kind offer which had been given him of applying to the College of Surgeons. He (Mr Payne) was not there to sit in judgment upon the acts of the Governors, for they were at liberty to do as they might think proper; but as one of the original Governors, he must express his regret that they should have made such a condition imperative, because it was casting a kind of slur on persons like himself, who felt that as Dentists they ought to be a separate and distinct body, and ought not to be in any way mixed up with the College of Surgeons. At the present time there are about 1,600 Dentists in practice throughout England and Wales, and of that number only between three and four hundred have thought proper to avail themselves of the certificates or diplomas of either of the Institutions by which they are granted; consequently, there are many hundreds of the most eminent men in the Profession who say, 'What have we to do with a diploma?' They have been in practice a great many years, and do not think it necessary to obtain a diploma as a proof of their qualification; so that the great majority of the Profession do not value the Dental diploma. It was quite right that in regard to the next generation they should endeavour to raise the character and position of the Profession; but they ought not to make retrospective laws."

Death of Professor Quekett, F.R.S.—This distinguished microscopist expired on the 20th ult., at Pangbourne, Berkshire, to which place he had been removed a few weeks since, in the hope that the change might be productive of permanent benefit to him. The deceased was the fourth son of the late Mr Quekett, head-master or the Langport Grammar School, at which institution he received his elementary education. At the early age of sixteen he gave a course of lectures on microscopic science, illustrated by diagrams and a microscopic of his own making ; and, truly, if anything was wanting to show the ingenuity of the boy, nothing could exhibit it so much as this instrument, made up of materials furnished by a common roasting-jack, a lady's old-fashioned parasol, and pieces of brass purchased at a neighbouring marine store-dealer's, and hammered out by himself. With this instrument, now in the possession of the writer of this imperfect sketch, Mr Quekett made some important discoveries. On the completion of the above-mentioned course he repaired to London, and was apprenticed to his brother, the late Edwin Quekett, the Lecturer on Botany to the London Hospital, at which institution he was entered as a student. He at once obtained the favourable notice of the medical officers of that charity. On the completion of his studies he became a licentiate of the Apothecaries' Company, and a member of the Royal College of Surgeons of London. This institution having just then established a Studentship in Human and Comparative Anatomy, Mr Quekett competed for the appointment, and was unanimously elected, immediately after which he set to work and formed an elaborate and most valuable collection of microscopic preparations, injected by himself with so much skill as to excite the admiration of all able to form any opinion of their value. This collection the Council of the College of Surgeons purchased. At the conclusion of the period for which the studentship was tenable—viz., three years,—he was appointed Assistant-Conservator of the Hunterian Museum. On the retirement of Professor Owen, Mr Quekett was elected his successor, as also Professor of Histology, an appointment which he held at the time of his death. Professor Quekett, who was only forty-six, leaves a widow and four children.—'Times.'

Explosion among the Vulcanizers.—Of all the machinery attached to the mechanical department of Dentistry, none should be more carefully and firmly manufactured than vulcanizers, as an explosion may produce very serious consequences. We have frequently heard of such cases, the last having lately occurred in the establishment of Mr B. W. Franklin, while testing a new vulcanizer manufactured by some one in the interior of this State. Soft solder had been used to fasten on the head of the machine, and as soon as the machine was sufficiently hot to melt the solder, an explosion followed, blowing the head off (not Mr Franklin's, but that of the machine), sending it through a thick plastering at a distance of fifteen feet or more, and driving the alcohol lamp downwards through an inch-and-a-quarter plank upon which the machine was standing. Had the machine been thrown out sideways, Mr F. and a friend, who were standing by it at the time, could not have escaped uninjured. Too much care cannot be taken in the use and manufacture of these machines.—'New York Dental Journal.'

NOTICES TO READERS AND CORRESPONDENTS.

All communications intended for insertion in this Journal must be authenticated by the name and address of the writer, not necessarily for publication, but as a guarantee of good faith.

Contributors are requested to be so obliging as to write legibly, and on one side of the paper only.

BOOKS RECEIVED IN EXCHANGE.

The Dental Cosmos for August.
The Dental Register of the West, for July.
Pharmaceutical Journal for August.
The Madras Quarterly Journal of Medical Science, Nos. 1, 3, and 4.

THE

DENTAL REVIEW.

OCTOBER, 1861.

ORIGINAL COMMUNICATIONS.

CROUPY INFLAMMATION IN THE MARGIN OF THE GUMS, AND ITS EFFECTS.

By DR STEINBERGER (Vienna).

Translated from the 'Deutsche Vierteljahrsschrift für Zahnheilkunde' (German Quarterly Journal of Dental Science) for April, 1861,

By George Henry, M.C.D.E.

Croupy inflammation of the gums is simply referred to by most authors, in their description of diseases of the mucous membrane of the mouth and throat, as "Diphtheritis membranacea;" and it is apparently regarded by the practical Surgeon as of less importance than when it attacks the throat, because he does not see in it so much danger to the life of the individual: and yet it merits special consideration, as well for its primary appearance in the margin of the gums, as for its morbid consequences, which may involve neighbouring osseous structures, as the alveolar processes, or the jaw-bone itself. This disease is of special importance to the practical Surgeon, who attends particularly to diseases of children, because it often assumes an epidemic form after scarlet fever and other eruptive diseases in hospitals for children, and even in large families: it is of equal moment to the Dentist, who is mostly called upon to treat it in its later stages, when it has produced loosening of the teeth, degeneration of the alveoli, or necrosis of the jaw-bone. When the disease occurs in adults, the Dentist often meets with it in its earlier stage, the patient being induced to consult him, partly owing to pain, partly to the fetid odour arising from the affection, which is a burden to his existence.

The disease presents itself under the following appearances:—The gum is inflamed, somewhat swollen, and very painful, and prone to bleed on being touched. In its early stage, the margin of the gums is found to be covered with a pale-grey, structureless membranous exudation, scarcely half a line in thickness, which sloughs off in flakes. The mucous membrane beneath is deprived of its epithelium, very vascular, and bleeds readily. The formation of the exudation commences generally externally—*i. e.*, on the labial and buccal portions of the gum of the lower jaw, and often first at its boundary with the lower incisors, whence it gradually progresses until the margin of the gums is completely involved. The gums of the lower and upper jaws are seldom attacked at the same time.

The exudation takes place rapidly, often in a few hours, not seldom in the course of a night; it is accompanied with a very painful sensation, described by the patient as a drawing pain: this is increased by stopping in warm places or in bed. Feverish appearances are slight, often scarcely perceptible.

As soon as the exudation is formed, it sloughs away in an ill-smelling, ichorous mass, which corrodes the mucous membrane beneath, producing an ulcerated surface. Not unfrequently, the mucous membrane of the cheeks lying on the teeth and diseased gums is covered to a great extent with this exudation, as also the border and under surface of the tongue. An inflammatory action is likewise set up in the lining membrane of the alveoli, through the ichorous discharge; it becomes strongly injected, swollen, and covered with exudation, which, after sloughing in the alveoli, particularly in those of the lower jaw, is retained, as it were, in a reservoir. The teeth become loose through the swelling of the periosteum, appearing longer to the patient; and through the continued presence of the corroding ichor, the periosteum is destroyed, and the teeth being disconnected with the jaw, either fall out of themselves or are readily removed.

When the periosteum is destroyed, this exerts its corrosive power on the bones, which become infiltrated with the fluid, carious in larger or smaller portions, and finally necrosed. In the almost epidemic cases of croupy gums occurring in the Hospital for Children last year, the opportunity presented itself for observing several cases, in which the alveolar processes had so disappeared, that in children of from four to six years of age, after the primary teeth had fallen out, the germs of the developing permanent teeth were exposed to view.

In the upper jaw, the destroying process does not proceed to such a depth as in the lower jaw, because the ichorous matter, being heavy, has a tendency to sink downwards, and thus considerably facilitates the cleansing of the parts; whilst, in the lower jaw, the decomposing fluid is retained in the alveoli and in the porous bones, thereby greatly favouring the extension of the disease. Frequently, necrosed portions of the alveolar process, an inch in length, are exfoliated. Necrosis does not always proceed from the alveolar border downwards; but the gums may be destroyed, and the anterior bony wall die away, leaving the dental germs exposed.

This disease occurs more frequently in children than in adults, and more often in those who have lately recovered from tedious illnesses—as scarlet fever, measles, and typhus—than in those who are otherwise quite healthy.

A chilly, damp dwelling is commonly an exciting cause, or exposure to a cold, damp draught: the latter is often the sole cause of such disease in healthy and often strong men, as travellers, or those engaged in business in wet localities. The disease only assumes an epidemic character in hospitals for children. This appears to arise partly from immediate contagion, through the transmission of the exudation from one child to another by means of various articles in use, and partly also from the weakness which follows long-continued illness. Sometimes a peculiar tendency does not appear to lie in any definite external circumstances; for it is a fact, that in the sick-chambers set apart for these patients their number will not diminish for several weeks together, but recruits are constantly added from other wards, whilst the earlier patients have long since been dismissed as cured.

The duration of this disease is dependent on its extent, especially on the stage in which treatment is first resorted to, and, further, on the general state of the patient's health. Its effects are generally more lasting and destructive when it succeeds a previous illness than when occurring in healthy individuals. Slight cases are curable in from eight to fourteen days, the more severe requiring often several months.

Treatment.—As croupy inflammation of the gums exerts its hurtful effects particularly through the lengthened presence of the ichorous product discharged from its generating source on the surrounding parts, the first thing suggesting itself as favourable to a cure is extremely careful cleansing. The best plan is, carefully to remove the exudation before it is thrown off. This is readily effected, and that without giving much pain, by removing the exudation, especially from between the teeth, with a dossil of lint held with an instrument. This done, the ulcerated surface is cleansed from blood by syringing with warm water: a little alum may be added when the hæmorrhage is excessive. When the mucous membrane is thus cleansed, the wounded surface should be touched with caustic, not forgetting to apply it well between the teeth. In the interim, the patient should frequently take warm mucilaginous decoctions in the mouth, which should be of a cleansing and soothing kind; and the cauterising must be repeated so long as any new exudation is formed.

As this disease calls for direct treatment, which is very often refused, especially by children, because it is accompanied with pain, and the nurse, and often even the doctor, avoids the patient on account of the dreadful fœtor, very neglected cases of this kind are constantly received for treatment. An ill-smelling fluid, a mixture of saliva and ichor, flows from the mouth; the lips and inferior maxillary glands are swollen; the otherwise indolent patient announces his approach to the doctor in tears and fear of coming pain. In such cases, the mouth should be well syringed with a slightly-aromatised warm fluid, in order to remove all loose matter. The patient, who feels an immediate benefit from this cleansing, soon endeavours to open his mouth, when all loose flakes of exudation can be removed, and the state of the teeth ascertained. If the teeth are found to be very loose, and ichorous matter flowing from the alveoli, the teeth must be removed, especially if they are carious, or, as is often the case in children, the roots are exposed.

If any necrosed portions of bone are discovered, they should be removed at once. After checking the hæmorrhage, the ulcerated portions should be cauterised.

Besides this local treatment, the "general" is confined to change of air, and, in the convalescent, a liberal diet. By careful attention to this method of treatment, no trouble being spared, the disease can be cured, and its effects limited; though a great extension of the disease in weak persons, particularly in neglected children, may terminate in death through absolute exhaustion.

THE DENTAL REVIEW.

LONDON, OCTOBER, 1861.

THE views expressed in our last number on the question of advertisements, and of their influence on the prosperity and *status* of the Dental Profession in this country, have met, we believe, with acceptation from all who are inclined to consider the point in a spirit free from prejudice or anger. Without in any way upholding the advertising system as one which is to be perpetuated or even encouraged, we showed in our previous arguments that there was an imminent danger in ruthlessly suppressing the advertisements of really respectable practitioners, who feel themselves necessitated, *nolens volens*, to give notice, under particular circumstances, that they practise their calling at certain times and in certain places. We showed the character of the danger to be feared—that the withdrawal of such modest advertisements would only lead gross advertisers to the greater success; and we may state now that further reflection and further knowledge have served but to strengthen us in the opinions we have expressed. We have been amused considerably, moreover, by perusal of those unhappy *litera scripta* which remain to show how certain of our brethren, who are now so anxious to tear the mote out of their brother's eye, forget the beam which once, at all events, deformed their own; and if we were wrathful critics, we should present such a picture of the past as could not fail to raise a very storm of vengeance. What a pity it were that printing should be so indelible, did it not leave us such satires as these!—

> "From Salisbury came I; oh, profane one,
> Where I saw a Puritane one
> A hanging of his cat on Monday
> For killing of a mouse on Sunday."

But to return to the question, as a pure question of ethics, we are bound to accept that until the Profession is better understood, and better organised, and more fraternal, and more united in heart and hope, the admission of a truthful advertisement must be allowed, and that that Society will do best for the Profession as well as for the public, which, while it steadily and progressively discountenances the advertisement system, does not, in the course of changing events, and an improving, but as yet imperfect organisation, refuse to exclude members who, allowing themselves to do no real wrong, act to a certain extent on a custom which they have been brought by early associations to recognise as allowable, and which they are convinced is essential, for a time, to their own prospects and existence.

We have been asked, what line, then, is to be drawn between reputable and disreputable advertising? The line is clearly defined, and needs no equivocation in its defence. Whatever is true and honest is reputable; whatever is false and pretentious, and dishonest, is disreputable. This, truism as it is, gives the answer to the question suggested. If a man simply states his professional address, with his hours of consultation, and that statement be true, he does no more moral harm than when he puts his plate on the door of his residence, and leaves a message that at certain hours he can be seen. This, therefore, morally and justly, is a proper advertisement in our sense of the transaction; but when a man pretends to do what others cannot do, or offers to undersell his brother-practitioner, he does moral harm, and puts forth an advertisement which no Profession could sanction.

It was on an acknowledgment of principles such as these that the College of Dentists at its commencement framed its laws respecting advertisement and advertising members. From then until now the College has acted in strict accordance with those laws, except in three or four exceptional cases which, through the inadvertence of a former scrutiny committee, were allowed improperly to pass uncriticised. Attempts have of late been made to move the Council of the College from its original position. We urge the Council not to be influenced by any such suggestions, but to press on in its present course, as the most liberal and reforming of all the courses it could pursue.

In placing the question at issue on this simple basis of truth and morality, we are content there to leave it; for, although it may be urged by our straitlaced friends that professional *esprit de corps* is something above morality and truth, we, as simpler individuals of poorer taste, and of less dogmatic cast, are satisfied to give them their humour. The issue of an advertisement of any kind has never, truly, been a part of our plan, nor an object of our ambition; but their standard of professional propriety, raised above the Christian law itself, is as far exceeding our desires as it is beyond our deserts.

THE month October brings to our minds again the fact that the Session is about to open, and education once more to have its way. Teachers are preparing their instructions, and Students are looking out with interest for the new pursuits opening before them. We wish them both success in their respective labours, and we are happy to be able once more to state that the prospects of the Session are very promising. There are already, we understand, several entries to the Metropolitan School of Dental Science, and we shall be much surprised if this year does not become one of the best of those which shall have occurred.

The arrangements for the ensuing educational Session are as follows:—At the College of Dentists, Mr Hulme is to give a Course of Lectures on Dental Materia Medica—a subject quite novel in this country, and of enormous importance. After him, Dr Richardson succeeds with a Course on the Condition of the Teeth in certain Constitutional Diseases. This will give the Doctor the opportunity for constructing a series of lectures of the same practical character as those already published 'On the Medical History of Diseases of the Teeth.'

In the Metropolitan School of Dental Science some changes are introduced. Dr Webb, who is now ably re-editing the work of Hunter for this REVIEW, takes the chair of Natural History, *vice* Dr Cobbold, who has resigned. The Course of Chemistry is to be extended through the whole Session, instead of three months as heretofore; and in Mechanical Dentistry Mr Perkins is joined by Mr Hockley.

The National Dental Hospital in Portland road is also nearly ready for commencing its operations, and will be open for Students early in the Session. The last step in the complete organisation of a system of Dental Education and Practice is thus completed, and we may well congratulate our brethren on the advancement which has been so rapidly and successfully secured.

REVIEW.

A MANUAL OF THE PRACTICE OF MEDICINE. BY THOMAS HAWKES TANNER, M.D., F.R.S., Member of the Royal College of Physicians, Assistant-Physician for the Diseases of Women and Children to King's College Hospital, &c. &c. Fourth Edition. London: Renshaw. 1861.

IN an age when the press may be said to team with works upon Medical Science, to announce the fourth edition of a book is to proclaim at once that it possesses more than ordinary merits, and that it has taken a permanent position in the Medical literature of the time. Under these circumstances, the reviewer is seldom called upon to do more than mention the appearance of the new edition of such a work, and examine how far the writer has kept pace with the advancements of his science.

As, however, Dr Tanner's work has not been previously introduced to the notice of our readers, we believe we shall render them greater service, and be able to do fuller justice to the production of a meritorious and painstaking writer, if we regard it as a new publication, and give a brief account of some of its contents.

Recognising the importance of those diseases which depend upon an abnormal state of the blood, whether arising from excess or deficiency in the quantity of the fluid, from changes in its constitution, or from the introduction of morbid poisons, those disorders are first discussed which depend upon alterations in the vital fluid. Few things are mere puzzling to the embryo student in Medicine than the different and apparently contradictory analyses of the blood which are met with in works on Physiology: it is only when he is further advanced in his studies that he comes to recognise certain facts as common to them all; that while they differ in the details as regards the various salts and proximate animal principles which exist in minute quantities, they all testify to the presence of the red globules of the blood, of a large quantity of albumen in a fluid condition, of certain salts, and of a small quantity of fatty matter. Now, in disease these elements may be altered; they may vary as to quantity, they may change as to quality. Thus, we have the disease

"Hyperæmia, or fulness of blood, consisting either of an excessive quantity of the vital fluid, or, as is most commonly the case, of a superabundance of the red globules, the quantity of the blood remaining unchanged, while in quality it becomes over-rich."

The opposite condition of Anæmia, or poverty of blood, may exist when this is the case.

"If the blood be analysed, it will be found that the red globules are deficient; so that, instead of existing in the proportion of about 130 per 1,000, as in health, they are reduced to 80 or 60, or even (in some cases) to 30."

Amongst the morbid changes of the blood, is one with which the pathologist has only recently become acquainted. It has received the name of Leucocythemia, or white-celled blood. The patients who have exhibited this peculiar state of the blood have generally

> "Suffered from an unusual pallor, like that of anæmia; from great emaciation and debility; from more or less swelling of the abdomen, owing to enlargement of the spleen or liver, or both; from disordered respiration, and from increasing prostration and emaciation, gradually ending in death. On placing an ounce or two of leucocythemic blood, which has been freed from fibrin, in a narrow glass, the red corpuscles sink to the bottom, while the upper part of the mass looks like milk. This appearance is due to the colourless corpuscles, and it may be distinguished from that caused by fat, as it is not removed by ether."

It has been previously mentioned that a certain amount of fatty matter is normally present in the blood. This element may come to be in excess, and then constitutes what is termed Piarrhæmia, or fatty blood.

> "The cases in which its occurrence has been noted are diabetes, chronic alcoholism, dropsy, jaundice, nephritis, hepatitis, pneumonia, and especially Bright's disease. In an interesting case of piarrhæmia accompanying acute diabetes, which ran its course very rapidly, and was attended with great prostration, the blood after death was found fluid, homogeneous, and of a dull-red colour like raspberry cream; while in a few seconds it separated into two distinct portions, the supernatant layer being of the colour and appearance of fluid venous blood. The creamy layer was certainly free fat, for it was wholly taken up by ether."

Diabetes, or, as it is now termed, Glucohæmia, was known as far back as the year 1660. It was, however, reserved for the illustrious Professor of Medicine to the College of France, Claude Bernard, to show that the liver is at all times a sugar-secreting organ.

> "Bernard was led to the conclusion that the liver secretes a substance which is changed into sugar by some ferment, instead of forming the sugar directly. This glugenic substance, when separated from the liver, presents the character of hydrated starch; and when it comes into contact with the supposed ferment in the blood, the transformation is effected. The sugar in the blood, when the latter reaches the lungs, is decomposed by the oxygen, and disappears; so that the liver produces the glucogen which forms the sugar, while the lungs are the organs in which the latter is consumed."

When the amount of sugar is abnormally increased, the lungs are unable to excrete the whole of it, and it passes off by the kidneys, constituting the disease commonly known as diabetes. These opinions of Claude Bernard have been modified by the observations of subsequent inquirers, but we have not space to enter further into this curious and interesting subject. It is the duty of the kidneys to eliminate from the blood the substance known as urea; and unless this function is duly performed, this material accumulates in the blood, and produces the disease termed Uræmia. The urea which is thus stored up in the blood does not act directly as a poison, but appears to be first converted into carbonate of ammonia, producing either a state of stupor from which the patient is roused with difficulty, or is soon followed by complete coma and stertorous breathing. In other cases, epileptic convulsions affect the whole of the muscular system, while consciousness remains unimpaired; and in a third series, the coma and convulsions are combined.

The following directions which are given for the detection of urea in the blood afford a good illustration of the assistance which modern Medicine acquires from the collateral sciences:—

"The serum from a good-sized blister is to be evaporated to dryness over a water-bath, and the residue extracted with alcohol, which is a ready solvent of urea. This alcoholic extract is then to be evaporated to dryness, and a little water added to make a syrupy mass, which is to be plunged into a freezing mixture, and a few drops of pure nitric acid added. If urea is present, the characteristic crystals of nitrate of urea soon appear in the solution, and may be positively recognised by the microscope."

As it is the duty of the kidneys to separate the urea, so it devolves upon the liver to form the bile out of the materials which are conveyed to it by the blood. Should any circumstances prevent this organ fulfilling its functions, symptoms of blood-poisoning may arise, which very generally terminates fatally in a short time. This disease is known as

"Acholia, or deficiency or absence of bile. This must not be confounded with jaundice in cholæmia, a morbid state in which bile exists in the blood owing to its reabsorption after having been formed by the liver. In the one case, we have retained in the blood those substances by the metamorphosis of which bile is produced; in the other, the blood contains the bile itself."

Ichorrhæmia, or Pyæmia, in which the blood has had putrid matter introduced to it, as sometimes happens in the cases of dissection, &c., is then fully considered in all its important bearings. Scurvy and purpura, hydrophobia and glanders, are next described. After giving an account of hæmorrhage in its various forms and in the different organs of the body, the writer having placed before his readers a very full and clear account of the vital fluid, and the morbid changes to which it is liable, proceeds to discuss the subject of inflammation generally, describing its symptoms, modifications, mode of termination, and the principles which should guide the practitioner in its treatment. Upon the latter point the following remarks are worthy of consideration, and form a striking contrast to the active method of treatment so universally pursued only a few years ago :—

> "On this point," says the writer, "I think it may be remarked that those practitioners who have the greatest amount of practical experience, combined with an extensive knowledge of physiology, pathology, and therapeutics, are now mostly agreed that our study should be confined to simply attempting to guide the morbid process to a favourable termination,—just in the same way as we at present try to conduct cases of typhus, small-pox, scarlatina, &c., through their natural progress, without making heroic and injurious efforts to cut short the disease. This object is to be obtained by supporting the vital powers instead of lowering them, and by assisting the excretion of effete products. During the early stages of the attack, all sources of irritation should be removed, so that the patient may enjoy perfect quiet of body and mind; the sick-room should be well ventilated, and kept at a temperature of about 60° Fahr.; the diet should be light, and cold water freely allowed; opium is generally to be administered if there be pain or much irritability; and if the febrile excitement be great, salines in small doses may be ordered. When the pulse becomes soft, good beef-tea and nutrients are to be administered; and directly there are indications of weakness, we may be sure that wine is required, in quantity varying from four to twenty ounces in the twenty-four hours. In all acute disorders the various organs are much weakened, so that their functions are either partially or entirely arrested. To give food when there is a perfect loathing of it, is worse than useless; but we may advantageously give alcohol and wine to retard the destructive metamorphosis of tissue, to afford to the system the elements for the generation of heat, to repair the nervous energies, and to supply a stimulus to the nervous system."

Dropsy, cancer, tuberculosis, melanosis, fatty degeneration, amyloid degeneration, constitutional syphilis, bronchocele and cretinism, gout and rheumatism, are the remaining subjects which are treated of under the head of general diseases, and complete the first division of the work. The second part is devoted to the different forms of fever. After this, the diseases of each system or set of organs are successively described, commencing with those of the nervous system. The organs of circulation and respiration are next considered, followed by the digestive organs and their accessory glands, the liver, pancreas, and spleen. The diseases of the peritoneum and ovaries constitute a separate division, as do those of the kidneys, the supra-renal capsules, and the bladder.

The diseases of the skin, the eye, and the ear, each form the subject of one division of the work, and the whole is terminated by a description of some of the most important diseases of the blood-vessels.

A large number of valuable and well-selected formulæ are placed in an appendix to the work, and form a very useful adjunct, since in many instances they consist of remedies that have been tested by the experience of men who have specially devoted themselves to the treatment of particular diseases. At the same time, however useful formulæ may be on certain occasions, the student should carefully avoid trusting to these ready-made remedies, but should furnish himself with that true knowledge of his art which enables him to rely upon his own resources. Let the student treasure up in his memory the following remark of the writer: that

> "The skill of the physician is shown by the administration of the proper remedy at the proper time. A druggist's apprentice can tell what drugs will purge, vomit, or sweat; but a man must be practically conversant with disease to be able properly to apply his therapeutical resources to the exigencies of any particular case."

We have thus endeavoured, as far as our limits would permit, to give a general notion of the work, and the manner in which the Author treats his subject. Every fact bespeaks the care which has been bestowed upon the book; and the numerous writers, both foreign and English, who are referred to on almost every subject, show that the Author is fully conversant with the views which have been put forth by his contemporaries. We can confidently and willingly recommend the work to the student both of Medicine and of Dentistry, as containing the best summary of the practice of Medicine at present extant in the English language; nor do we know where he could meet with the same amount of information within the same limited space. Dr Tanner says, "I have endeavoured to paint the features of disease not imperfectly, but—as it were—in miniature;" and in this we think he has fully succeeded.

SELECTED ARTICLES.

DENTITION AND ITS DERANGEMENTS.

By A. Jacobi, M.D., Prof. of Infantile Pathology and Therapeutics.

(From the 'American Medical Times.')

(Continued from page 318.)

Lecture IV.

In order to complete the anatomical and physiological part of our subject, let me proceed to some remarks on the permanent teeth. You remember, from my previous lecture, what I said, following the description of the process as given by Harrison, on the first formation and development of the temporary ones. Soon after the commencement of the saccular stage of the deciduous teeth, the rudiments of the second or permanent set are developed. About the fourteenth week of fœtal life the deep portion of the primitive dental groove is closed in, and contains the sac and papillæ of the ten milk-teeth; the upper or superficial portion of the groove remains open, and is then named *secondary dental groove.* In this commence the rudiments of the permanent teeth. At first a small depression is observable behind the superior openings of the milk-sacs; this increases, and forms the *cavity of reserve.* These cavities are lined by an inflection of the mucous membrane, and at the bottom of each a small papilla is formed; they gradually recede from the surface, and are thereby converted into follicles, and finally into closed sacs, which lie to the inner side of and in close contact with the former set, and inclosed in the same submucous tissue. The necks of these sacs, by which they originally communicated with the general mucous membrane, continue as obliterated cords leading to the surface of the gum, internal to the deciduous teeth. These cords have been named the *gubernacula*, or *itinera dentium*, roads of the teeth, without having, however, any such office as the name would appear to imply. The primitive dental groove, behind the posterior deciduous molar, does not close so soon as the anterior portion, and in it are developed about the fifth month of fœtal life the follicle and papilla of the anterior permanent molar. After its follicle has closed, the dental groove closes over it, leaving a space between the gum and the sac of this tooth; in this is a cavity of reserve of mucous membrane for the second permanent molar, and one also for the third molar or wisdom tooth. As the deciduous sacs, as well as the anterior permanent ones, increase in size more rapidly than the bones can elongate, this cavity for the permanent molars is pressed backwards into the maxillary tuberosity above, and into the root of the coronoid process below; but in a few months after birth, as the jaws increase in size and length, the first permanent molar returns to its proper level in the dental range; the cavity of reserve behind them dilates into the space the first molar occupied, and in it is developed the papilla for the second permanent molar. In the course of time, as the jaws further elongate, this tooth advances and descends, and the remainder of the cavity of reserve dilates behind for the third permanent molar or wisdom tooth.

The permanent sacs at first receive their vessels from those of the gum, but afterwards from the temporary sacs; and as they retire into their own cells, these new vessels enter into new dental canals, which become permanent. In the course of a few years, and after all the temporary teeth have appeared, the further elongation of the jaws admits of space for the first true molar to protrude; this usually occurs between the sixth and eighth years, and sometimes even sooner. At this age there are fifty-two teeth in the two jaw-bones; viz., twenty deciduous teeth, twenty permanent beneath these, and the twelve posterior molars; and when all the anterior permanent teeth have become enlarged, they press upon the anterior wall of their alveoli, which soon undergo absorption; and then each tooth comes a little forwards into the lower part of the alveolus of the milk-tooth; the fangs of the latter are absorbed and gradually wholly removed, and then the crown falls out of the sac and the permanent tooth supplies its place. The cause of the disappearance of the roots of the temporary teeth is sought for in the loss of nutrition from the pressure of the *subjacent* permanent tooth, and perhaps in contemporaneous increase in the general injection and nutrition, bringing on liquefaction and absorption. Some pressure is necessary, at all events; for whenever there is no pressure from below, the temporary tooth is not removed. But you must not imagine that the permanent tooth exercises any immediate pressure on the blood-vessels, thereby depriving the temporary tooth of its nutrition: if this was the case, the permanent tooth would exercise just the same influence at a much earlier period, even while the temporary itself was not fully developed. The crowns of the permanent molar teeth, further, are perfectly unable to exercise any pressure on the blood-vessels of the temporary, as they are situated between their roots. The nutrition of the temporary teeth is impaired by two facts: first, by the increasing development of the permanent themselves, and further by the development of the maxillary bones, which contract and partially obstruct the canals through which the branches of the maxillary artery penetrate to the tooth. The pressure of the permanent tooth on the temporary one is not at all direct; nor is it necessary that it should be so. Nature usually, in building up and destroying, works very slowly and invisibly. A fine instance of what a slight pressure for a protracted period may effect, and how bones are absorbed from the pressure of a slight physical influence, is given in the fact that aneurisms of large arteries at some parts of the body, where they are in the neighbourhood of bones, destroy the bone by slow, gradual absorption. Thus aneurisms of the aorta are reported to have produced absorption of part of some spinal vertebræ; and I have myself seen two or three costal cartilages absorbed from the constant hammering against the chest by a large aneurism of the ascending aorta. You see, therefore, that the pressure of the permanent tooth inclosed in its cell, on the wall separating it from the temporary tooth, it being slowly and continually forced upwards, may be deemed sufficient to bring the root of the temporary tooth to absorption. The effect of the permanent teeth is not in one direction only, for you know that the permanent teeth are not situated in the same horizontal line; the steady, slow pressure is exercised upwards and laterally: thus the roots of the molar teeth are absorbed on their inner sides; and the middle permanent incisors press not only on the corresponding temporary, but the lateral ones also. The root of the temporary tooth, while being deprived of its normal nutrition by pressure exercised on the periosteum, is liquefied by the increased action in the surrounding parts, brought under the influence of the numerous absorbent vessels contained in the sac of the onwards growing tooth, and excreted like so many other effete matters. The vessels rendering this service to the organism have been made the subject of particular study by Bourdet, who called them "appareil dissolvant," and Delabarre, that learned humbug and nostrum-seller, who comprehends them under the name of "appareil absorbant." This resorption can take place as long as the root is in some connection with the surrounding parts. If it ceases to be so, the vital powers of absorption are replaced by another; in this case the root has the general effect of a foreign body brought by some means or other into contact with and imbedded in the organism, to produce inflammation and to be removed by suppuration. Thus no resorption takes place even when the crown of the permanent tooth comes into immediate contact with the root of the temporary; in which cases the temporary teeth, particularly the molar, are found to be turned over and produce, by the effects of their sharp roots, deep ulcerations in the cheek, which will not heal before the temporary tooth is removed.

The permanent teeth appear no more nor less at regular periods than the temporary ones. About the seventh year, or earlier as I mentioned before, the first permanent molar appears nearly about the time when the first temporary incisors are replaced by the permanent. After all the incisors are changed, the anterior and posterior temporary molars are successively shed and replaced by the permanent bicuspides; the canines are changed about the tenth or eleventh year. About the twelfth or thirteenth, the second permanent molars appear; the last molars, or wisdom teeth, usually some time between the twentieth and thirtieth.

Ossification requires but a short time in the deciduous teeth, and longer in the permanent. A permanent incisor requires seven years, a canine twelve, a molar from eight to ten years. Ossification commences at the very same time in incisors and the first molars, as is proved by the dissection of the jaw-bones of infants who died in the first months after birth. It progresses more rapidly in the female than in the male sex: girls, therefore, have their permanent teeth sooner than boys.

In the lower jaw of a child three years of age, the permanent teeth are still in an oblique direction. Only the middle incisors, which are the highest, are in a nearly vertical position; the lateral incisors are situated more inwards, and more obliquely; the lowest are the canine teeth. Higher, and between the roots, we find the molar teeth in their first stages of development, or rather the first one; for as to the second, we find nothing but cells in which it will be contained in future. The time of its first formation is about the fifth year. As it requires about eight years for its complete ossification, it makes its appearance about the thirteenth year of life. The commencement of ossification in the third molar tooth, and particularly its appearance, is more uncertain, as it depends on local circumstances. It does not usually appear before the twentieth year, but in some cases, according to C. Harris, does not show itself until the thirtieth or even fortieth year; and Canton extracted one for a gentleman seventy-four years of age, who informed him that it was not out until he had attained his seventieth year.

The maxillary bones of a child of from four to five years contain so many and so large cells, for both the temporary and permanent teeth, that but very thin osseous walls form a bridge between the external and internal wall of the jaw-bones. Nevertheless, every tooth, both temporary and permanent, receives a ramification from the common maxillary blood-vessels and nerve. There is sometimes, according to Delabarre's observation, an anomaly in the lower jaw, of this sort, that the submaxillary artery and nerve, right at their entrance into the maxilla, divide into two branches, one of which feeds the temporary, the other the permanent teeth. The periosteum of the alveolar cell, being a mere continuation of the external periosteum, takes its blood-vessels from the maxillary artery, branches of which penetrate the porous osseous substance.

A very interesting subject relating to our investigations is that of the so-called third dentition. Is there at all a third dentition? Are those teeth which we are used to call permanent, not permanent, but subject to be temporary only in proportion to those which are to be, as it were, more permanent? Certainly there are a number of cases reported, in which the teeth are said to have fallen out twice, and to be replaced twice. There is one case even of the following description: In a girl the first replacement, the second dentition, took place at six years, the third dentition at twelve; this latter was complete in a single year. This case, our author says, "is highly interesting for two reasons: first, because it occurred in a young individual, while cases of third dentition have been hitherto related of old people only; second, because all the teeth were replaced here by others, while the third dentition has always been incomplete, and limited to the appearance of two or three teeth only." The case, gentlemen, looks so very interesting and beautiful, that I am afraid the reporter is greatly mistaken, or has been grossly imposed upon. Other cases of third dentition are reported, but scarcely any of such a remarkable kind as this one. At all events, we require a good deal of belief in the veracity or the judgment of a writer, if we are to take as scientific facts such reports as are in open conflict with the known laws of anatomy and physiology. W. Jackson has the cases of a man of sixty-four, and of a woman of eighty years, in whom a third set of incisors was observed; in one of them the old teeth had just fallen out to make room for the new ones. Sorgoni reports the case of a boy exhibiting a third dentition before he was twelve years of age, and Andral has collected from literature twelve cases of the same anomaly. Lison reports the case of a boy, Eugene Cavillan, thirteen years old, of young and healthy parents, of good constitution and well, and without any anomaly in his general development. The second dentition took place when he was nine years old. Soon after, all his twenty-eight teeth were replaced by others; the same occurrence took place between his tenth and eleventh year, and again between the eleventh and twelfth. When the case was reported by the author, the boy was said to be in his thirteenth year; at this age a new set of teeth was being developed; the first inferior molar tooth of the right side fell out, to give way to another that was already visible. The teeth that had fallen out had no roots, which appear to be eroded. The removal and replacement took place always in the usual order, the teeth being small, white, and of normal shape and position. The gums were red and somewhat tumefied, and the general health of the boy satisfactory.

I consider it a characteristic occurrence that curiosities like those alluded to are more numerous in old, very old books, than in modern ones. Storch, alias Pelargus, who wrote in 1750, reports the case of a lady of seventy years, who, after having lost all her teeth for a number of years, had a new incisor at that advanced age. He further has the case of his own daughter, who cut five molar teeth in her twentieth year; lost them all, and had new ones in their place when she was thirty-eight years old. Before this time, our author says, the lady was always sick from this abnormal teething—the symptoms enumerated, however, being evidently of uterine and hysteric nature; but after the last teeth cut, she became healthy, and strong, and fat. Old Paulinus relates the case of a Countess of Detmond, who lived up to a third dentition, in 1589, and grew one hundred and forty years old. The younger Pliny has the observation of the last molar tooth appearing at eighty years of life; Schottus, at forty years, in a physician of his acquaintance: Cardanus, the celebrated mathematician and inventor of the Cardanian Formula, is reported to have cut a tooth at forty-three; several soldiers, at forty-three, forty-four, and forty-five; several others, according to Sennertus, at sixty-three, seventy-five, eighty, eighty-one, eighty-eight, even at one hundred and four years of age. In an old book of 1725, there is the case of a woman of sixty-six years, who got not only new teeth, but new brown hair, instead of her former grey. Johannes G. Slevogt reports, in 1733, the case of a captain who cut new teeth at ninety-four years of age, and died soon afterwards: we do not learn whether the old man died in consequence of teething, or whether, if he had not teethed again, he would not perhaps have lived up to our times, and been still older than ninety-four. But the greatest curiosity I have ever been able to hunt up is the following, reported by Möllenbroc, a century and a half ago. There lived at Leipsic a noble lady who had five children; with every confinement she cut a molar tooth. As soon as one of her new teeth got loose, the child who was born at the time when it was cut was affected with some severe disease. If such a tooth fell out, she was always certain that the corresponding child was surely going to die. And so it happened, adds our honest author, all the three children died before the mother. Thus you perceive, gentlemen, that as it is said to be customary now-a-days that children die from their own teething, it was customary for children in olden times to perish from the dental troubles of their mothers.

Both Courtois and Aimonino have published cases in which a third dentition took place after the permanent teeth fell out: Courtois is of the opinion that the third dentition is observed in the incisors only. If such was the case, why, we must expect that the teeth of the third period were formed contemporaneously with those which were then eliminated by the growth and onward pressure of the subjacent ones. At all events, the belief in a third dentition was so general formerly, that decayed teeth would be removed in the hope that a replacement would take place. Professor Nessel, whose name I have mentioned before, has observed a girl whose middle upper incisors had been extracted in the hope that they would reappear. But not only no new teeth appeared, but the space in which two teeth had been seated formerly was so much intruded upon by the neighbouring ones, that but one artificial tooth found sufficient room afterwards. Now, what Nature will not do in youth, she will hardly succeed in doing in old age, where all the reported cases of third dentition are said to have occurred. There is less probability of new germs of teeth forming and developing themselves in advanced life, than that there have been from the beginning supernumerary teeth; instances of which have been reported by Ruysch, besides those enumerated in my second lecture.*

The fact that teeth will protrude, sometimes, at old age, is undoubtebly true. Instead of being, however, the symptoms of a renewed power of reproduction, they are, in Professor Nessel's opinion, frequently the results of regressive life; as they become visible after the diminution of the alveoli, and the decrease of the thickness of the gums. Such teeth were always formed, but were either invisible from being sometimes incuneated like the canine, or from being covered by an osseous mass, like the wisdom-teeth. The second molar tooth, particularly, has been observed to reappear in advanced age, but only after the temporary second molar had kept its place, and fallen out at a very advanced period of life. It is not a very rare occurrence that the temporary second molar tooth remains at its place up to the fortieth year, and thus there can be no mystery nor wonder about the fact that another tooth will make its appearance afterwards.

The temporary second molar tooth, however, is not the only one that will remain for a long period, and thereby retard the second dentition. Linderer reports the case of a girl who had her first permanent molar tooth with her eighth year, but whose second dentition did not begin before the fifteenth year. Another healthy and robust girl of fourteen years, who never had the four upper incisors, had all her other milk-teeth, yet without there being any probability of an approaching change. Murat has the case of a robust young man of seventeen, who had all his milk-teeth but five; and Bird and Maingault report similar cases. Other cases are noticed, by Linderer, of single milk-teeth remaining up to the thirtieth or fortieth year; and Riecken gives the history of a man of eighty-five, who cut a number of incisors and molars, and is said to have suffered, during his cutting a molar in his left lower jaw, from cerebral congestion, which was relieved, after local depletion had no effect whatever, by spontaneous hæmorrhage from the inner angle of the eye. Finally, a woman of forty-three years was observed by Düntzer, who had all her milk-teeth left. After she had been suffering from intense pain in her head and upper jaws, from swellings of the gums and diarrhœa, four teeth protruded behind the upper incisors; they were smaller and sharper, and troubled the functions of both mastication and articulation. After the lapse of a year, the same symptoms were observed in the right lower maxilla, which never had any molars before.

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* See DENTAL REVIEW for April and May, 1861.

Kneisel reports the case of a lady who reproduced four inferior incisors in her fifty-fourth year, after having worn artificial teeth for some time; and a right upper incisor, in place of one that had just fallen out, two years afterwards. The teeth which had fallen out were undoubtedly the temporary ones that had never been removed, and finally fell out at an advanced age from being either pressed upwards mechanically, or being decayed; nobody can say which, as the report does not contain anything beyond the facts I have related. Professor Nessel has the case of a lady who cut a fine white canine tooth at fifty years of age. This tooth became more visible from year to year, not because of its growth, but because of the decrease of the alveolar margins of the maxillary bone. It had been, in his opinion, always formed and ready to protrude, and would have done so but for the other teeth occupying the space naturally designed for it. The same author reports in his book on Dentistry (1856) the case of a gentleman of thirty years who still had his temporary upper incisors.

TREATISE UPON THE GENESIS AND DEVELOPMENT OF THE DENTAL FOLLICLES TO THE EPOCH OF THE ERUPTION OF THE TEETH.

BY DRS CH. ROBIN AND E. MAGITOT.

(Translated for the 'Dental Cosmos,' by E. SUREAU.)

(Continued from page 373.)

As soon as the first vestiges of ivory appear at the summit of the papillæ, in the shape of small caps of dentine, the tissue of the bulb entirely ceases to grow in height on the side of the papillæ; but it continues to increase in size, and especially in width, on the side of the vessels, until the different caps of ivory united to each other reach the place of the greatest circumference of the organ. The bulb then ceases to grow larger, and at this moment its size answers exactly to that of the future crown, provided that it is joined with the body of the first bed of ivory, itself capped with the bed of enamel. The period when the coronary portion of the bulb ceases to increase, corresponds exactly to the moment of its envelopment by the first bed of ivory.

As soon as the preceding phenomena are manifested, the bulb, while diminishing in size, changes its form. The width of the bulb decreases progressively in proportion as the first bed of ivory thickens, and at the same time the bulb essays an elongation corresponding to the formation of the base of the crown and to the development of the roots, so that it is gradually enclosed in a cavity, which is formed by the successive productions of the ivory: this is the pulp-cavity afterward found in the adult.

When the crown is completely produced, the bulb still continues to lengthen in proportion to the development of the roots; and it is at this time that its base is seen changing its shape. These changes are especially apparent in the molars. In the latter, indeed, the bulb, like the triturating surface of the crown, produces as many divisions as there will be future roots. When these divisions of the bulb are externally marked and have become distinct, they continue to lengthen simultaneously with the roots of the tooth itself, each of them being lodged in the corresponding root, and adhering strongly by their radicular extremity to the wall of the follicle. These divisions of the bulb, like the part occupying the centre of the crown, preserve a certain thickness during the whole period of childhood; that is to say, their diminution is but slowly effected; while in the adult, on the contrary, this diminution seems a little more rapid in the same time than the increase in the thickness of the ivory. These two contrary phenomena are perfectly regular, and continue to an advanced age; and this progressive atrophy of the bulb may be observed in some old persons even until the organ has completely disappeared.

To recapitulate, we can in a manner assign three successive phases to the general evolution of the bulb:—1st. It gradually increases in size until the time when its summit is covered by the primitive cap of dentine. 2nd. The bulb ceases to enlarge at that time, but it continues to rise in height, while the crown is simultaneously increased in width. 3rd, and finally, this last phenomenon terminated, the coronary portion of the bulb ceases to grow larger, and radicular prolongations are detached from the base.

It is through the whole duration of these phenomena that the modifications of texture are effected, which give the tissue of the bulb a greater and greater consistency. These modifications can be observed in all the species of animals, and are always in constant correlation with the general changes in the form and size of the tooth.

But before we set forth these particulars (to which we will return, since they are not the same through the whole period of the dental evolution), it is necessary that we should indicate the texture of the bulb at the time.

From the time when the summit of the bulb becomes distinct in the tissue, at the heart of which it begins to appear, it is constituted of ovoid nuclei which are from $\frac{7}{1000}$ to $\frac{8}{1000}$ of a millimetre in length, with a clear, greyish outline, more granulated and smaller than the embryo-plastic nuclei of the surrounding laminated tissue, but without nucleoli. This tissue then contains only nuclei—they are very close to each other without being contiguous, because a small quantity of slightly-granulated amorphous matter lies between them. This amorphous matter is so resistant, that it gives to the entire bulb, and to the fragments of its tissue, a certain consistency which it is difficult to destroy, and also an elasticity which makes it slip between the plates of glass when it is a little compressed. This, added to the nearness of the nuclei constituting the tissue, gives it an appearance which is altogether peculiar.

The amorphous matter extends about $\frac{1}{100}$ of a millimetre beyond the most superficial nuclei at the periphery of the bulb, and exhibits no molecular granulations, or only very few in comparison to that which is interposed between the nuclei.

At this time no cell of ivory exists at the surface of the bulb in the thin bed of amorphous substance. The surface of the latter can be torn as cleanly as the rest of its depth in the yet fresh nascent bulbs. But gradually, even before the cells of the ivory originate, the surface of this amorphous matter becomes denser than the subjacent part, commencing at the summit of the bulb, and it is easily corrugated.* When the tissue of the bulb is torn, this superficial bed detaches itself from the subjacent portion in extremely transparent strips, without granulations or striæ, so thin that two lines more than measure its depth.

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* Raschkow has given the name of *membrana præformativa dentis* (1835) to the superficial bed of the bulb. He has also noticed that the tissue of the latter is distinguished from the tissue of the organ of the enamel by the granules which compose it, and later by its nerves and vessels. The bulb, which is vascular before the appearance of the dental cells, does not at this time contain nerves—these vessels and nerves we will hereafter describe. The thin membrane, of a cellular nature, proper to it, described by M. Oudet (loc cit., 1835, Art. Dent., p. 98) cannot be seen on the surface of the pulp, unless the organ of the enamel is the matter in question.

This bed or membrane folds with the greatest facility, and is readily detached, but irregularly, by tearing, when the bulb begins to be affected by the cadaveric changes. We will see hereafter that it ceases to exist at the point of junction between the base of the bulb and the follicular wall, when, instead of the nuclei of the former, we find laminated fibres at the base and in the wall, forming the inner surface of the wall as well as its thickness.

Section 6. *Of the Organ of the Enamel in particular.*—We are already aware that a very short time after the wall of the follicle reunites in a closed cavity, there originates, between the inner face of the wall and the surface of the bulb, a thin gelatiniform bed, composed of star-studded fibro-plastic bodies, which are ramified and anastomosed. This membrane is the organ of the enamel, which soon exhibits on its deep or bulbular surface the continuous range of the cells of the enamel; these are prismatic and vertically arranged, and when seen as a whole under the microscope appear like a clear band.

The wall of the follicle shows the same external configuration as the bulb upon which it is shaped, and consequently the space insensibly produced between the two also exhibits the same form. The organ of the enamel, exactly occupying this space, is then represented by a real plate of nearly the same thickness throughout; this plate is about $\frac{1}{100}$ of a millimetre in depth at the origin of its development, and becomes gradually thicker. It is moulded upon the intra-follicular or non-adherent surface of the bulb, with which, as we have already stated, it has elsewhere no connection, except the simple relations of contiguity. The general form of the organ is then that of a bed arranged like a hood or a hollow cone, with a depression, single or multiple, according to the species of tooth—the deep excavated face exactly covers the whole projecting part of the bulb. The circumference of the base is thinner than the rest, and fills the furrow which the inner face of the follicular wall forms with the bulb, near their point of union.

From the time of its appearance we can distinguish in the organ of the enamel two faces, one follicular, the other bulbular, and an edge.

We repeat that the follicular face adheres by contiguity to the inner face of the follicular wall, of which it follows the outline, and reproduces its configuration, so far as the compression has not separated them. This anatomic arrangement, which becomes still more distinct in the sequel, shows the facility with which the detachment of the organ is effected, just as the consistency of the firm gelatine of the tissue exhibits the remarkable exactitude with which it preserves, even when separated from the follicle, its conical or cuneiform mammillated form, which is the exact reproduction of the external shape of the bulb itself.

The bulbular face, opposite to the preceding, lies against the surface of the bulb, to which it also adheres by simple contiguity, and from which it will be afterward separated by the production of the dentine. The development of the bed of cells, called cells of the enamel, likewise occurs on this bulbular or deep face. These cells form, at a later period, the prisms of the enamel.

The edge is thin, pale, and transparent, and lies exactly in the furrow, which follows the circumference of the base of the bulb until it meets the follicular wall.

The organ of the enamel folds easily, on account of its membranous disposition, under the preceding conditions, or when the pressure of the follicle has removed it entirely or in places from the bulb, or the follicular wall. These folds are very thin and delicate, in consequence of the transparency of the organ; they often start from the summit of the bulb or its papillæ, and run toward the base more or less parallelly with the outline of the wall.

The organ of the enamel, absolutely without vessels, is from the time of its appearance composed of embryo-plastic nuclei, and limpid amorphous matter without molecular granulations, which originate between the wall and the surface of the bulb. These nuclei rapidly become quite large, with a distinct outline, clear in the middle, and often with one or two nucleoli. They become the centre of generation for as many fibro-plastic bodies, which are generally star-studded, and have fibrillar prolongations, which are quite rigid, and often anastomosed: the interstices between them are filled with the amorphous matter mentioned above. The particular gelatinous consistency of this tissue, which is much less than that of the bulb, is owing much more to the intercrossing of the fibrils, and to the anastomoses of one embryo-plastic body with another, than even to the consistency of the amorphous matter considered individually, which fills the intervals and gives the tissue its transparency by its presence. Unlike that which is seen in the bulb, it is soft by itself, and becomes ropy and viscous in the destruction of the organ, reduced by liquefaction into little pale drops as soon as the fœtus is injured, or the preparations are in water for some hours.

It is when this occurs in the dead body of the new-born beginning to putrefy, and in the fœtus preserved in alcohol, that the organ of the enamel reaches the state of a viscous liquid, which ropes like synovia, and is yellowish or reddish in colour. This matter is formed of a finely-granulated fluid, containing some cells of enamel, and star-studded fibro-plastic bodies, with their fibrils broken off more or less near the nuclei. These substances of the follicles are forced out when the wall is cut. In infants, but a short time dead, and in the veal and lamb of the butcher's stall, -it does not exhibit this fluidity; it remains transparent and elastic, like the firm jellied gelatin, and can be torn into small fragments which slide under the plates of glass. Later, when we give a detailed description of the elements of the organ of enamel, and of the evolution of the latter, subsequent to the appearance of the ivory, we will exhibit the curious modifications that occur in these star-studded bodies soon after death.*

Thus we see that there are no great difficulties in the examination of the mode by which each of the constituent parts of the follicle originates, or makes its first appearance. This is also the case in the study of the ulterior phenomena of their development.

In a series of favourable preparations, we can follow all the successive phases of the genesis, development, and atrophy of each element of the follicular apparatus. We have seen that the dental bulb, or organ of the enamel, is the first to appear, and we have recognised it at its commencement as a small conical mass, trenching by its opacity upon the surrounding tissues. The first rudiments of the follicular wall afterward show themselves around this little mass; and when this wall completely surrounds the bulb, the organ of the enamel appears between them.

Such are the facts of the evolution and the constitution of the follicle in man and most of the mammiferæ. But we will find hereafter that in certain species, the pachydermata, for example, the follicle contains another organ filling a special office. This organ is the germ of the cement, formed of a soft, vascular fibro-cartilage, and which changes the tissue, of which the cement is constituted, into the condition of bone properly so called.

On what part of this completed follicle should the constituent elements of the tooth, properly so called, appear? It is at the summit of the simple or multiple papillæ of the germ of the ivory, in the most superficial bed of the organ, and, consequently, beneath the deep face of the germ of the enamel—here the first cells of the ivory are produced, and to them succeeds the little cap of dentine. The development of the ivory then gives rise to the separation of the two germs, of the ivory and the enamel, with the atrophy of the latter. This separation is still more increased by the ulterior phases of the evolution and of the thickening of the bed of ivory.

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* It is not probable that this is the organ of the enamel of which Hunter is speaking when he says that the envelope of the pulp is composed of a soft, spongy lamina, without vessels, *and of another inner one, which is much more resistant, and extremely vascular, receiving its vessels from those which go to the pulp*, and forming a sort of capsule for the pulp and the tooth. It is certainly of the organ of the enamel softened, as we will describe it, that he speaks, when he adds that a mucilaginous liquid, resembling the synovia, is always found interposed between that membrane and the pulp. M. Oudet, on the contrary, describes the internal membrane that he admits is in the follicle, as being smooth and polished like the synovia, which is due to the limpid liquid, merely disturbed by light flocculi and of a mucilaginous consistency, which is contained in the cavity. (Loc. cit., 1835, p. 97.) The presence of these flocculi of the star-studded fibro-plastic bodies, either anastomosed or not, shows that the organ of the enamel, liquefied by cadaveric alteration, is the matter in question here.

This first appearance of the tooth, properly so called, answers in man, according to our observations, to a period varying between the eightieth and eighty-fifth day, and it takes place primitively in the heart of the follicle of the lower middle incisor.

(To be continued.)

PROCEEDINGS OF DENTAL SOCIETIES.

MEETING OF THE CENTRAL SOCIETY OF GERMAN DENTISTS.

We are indebted to the kindness of our German Correspondent for the following account of the meeting of the Central Society of German Dentists, held at Dresden, August 29th, 1861 :

When, two years ago, at the instigation of Hr Fricke, a little band of German Dentists met together at Berlin for the purpose of deliberating some scheme by which a unanimous co-operation of German Members of the Profession could be brought about, perhaps no one of those present, even though he may have entertained the boldest hopes, ventured to expect that their endeavours would lead so soon to such brilliant results; and much less was this to be expected, as a few colleagues who engaged to assist in the union movement were soon led through certain interests to abandon the cause, and even devoted their efforts in a direction which aimed at nothing less than the ruin of the organisation commenced. But when the right means are employed at the right time, the accomplishment of an urgent necessity is not to be prevented.

Thus we have this year witnessed, on the 26th, 27th, and 28th of August, an excellent meeting of the Central Society of German Dentists at Dresden ;—excellent, through the coming together of nearly fifty German colleagues from all parts of Germany, and even from Switzerland ; to whom also a Transatlantic member of the Profession, then staying in Europe, had joined himself ;—but excellent still more through the spirit of friendship and true cordiality which generally prevailed, and the display of professional zeal eager to avail itself to the utmost of the scanty period allotted for the consideration of the numerous subjects in which all present were interested.

After the opening of the meeting on the 26th of August, at 9 a.m., the Secretary of the Society, Dr Kramer of Hamburgh presented, with an appropriate speech, an elegantly-carved ivory hammer to the President, which was dedicated by members of the Society at Hamburgh to the President of the Central Society, and bore an inscription with the names of the donors.

The first subject brought under the notice of the meeting was the "Filling of Teeth, together with the materials, instruments, and manipulations employed in the operation." The animated discussion which ensued, and the great number of speakers who participated, communicating their various experiences, bore testimony to the great attention which is accorded to this most important subject in Germany. In reference to the debate, which will be fully given in the report to be duly published, I shall only remark that the majority preferred gold as a material for stopping teeth ; and that Hr Garke of Charlestown, South Carolina, strongly advocated tinfoil as a substitute for gold, not merely because of its cheapness, or the greater facility with which it can be manipulated, but more particularly on account of its being very suitable for tender teeth. Hr Kästner of Cologne confirmed this opinion, and observed that, in cases where teeth stopped with gold were very susceptible to changes of temperature, he had substituted tinfoil, when the sensibility disappeared.

The next subject was "The best Method of treating the Exposed Pulp." The conclusion arrived at was, that when the pulp is not accessible with instruments, arsenic is the surest medium. The necessity of creosote was not acknowledged ; and Hr Garke remarked that he used the white arsenic without any addition, and formed it into a paste with any kind of fluid. In order to remove the sensibility of dentine, it was recommended, if a large surface was effected, to make use of the actual cautery ; but should the sensibility be confined to small portions, these should be cut away with sharp excavators.

The application of caoutchouc as a base for artificial teeth, the hardening of the same, and the construction of suction-plates, particularly engaged the attention of the meeting. In order to test a vulcanising apparatus exhibited and constructed by Hr S. Pappenheim, of a very compendious form, and requiring only one hour and twenty minutes for vulcanising, a Committee was formed, consisting of the Hrn Schultz, Suersen, Reinhardt, and Wunder. These gentlemen came to the conclusion that the apparatus was certainly capable of accomplishing all that was promised ; for the test-piece which had been introduced was hardened in forty minutes after the temperature had reached the height directed, although up to that point of time one hour was required, for the lamp which was used for firing, owing to some deficiencies, did not give sufficient heat, a circumstance which, however, can be easily remedied, as the apparatus which was there for testing was incomplete, and the first of the kind that had been constructed. A very neat apparatus for the same purpose was exhibited by Dr Garke, who also demonstrated its construction and use. This apparatus was very compact, its peculiarities consisting in a well-adapted safety-valve and a steam-pipe, which, on the desired temperature being attained, gives an alarm in case the person in attendance should be absent. Hr Garke made a few observations on impression-taking, and remarked that success in the adaptation of suction-plates depended mainly on an accurate impression. We would also mention his method of striking up plates, which consists in using three metallic counter-models of different depths—the first being very shallow, and the third sufficiently deep for the final striking up.

That which tended specially to increase the interest of this year's meeting was the introduction of practical demonstrations, by which the subjects discussed were made apparent, so that it really acquired the character of a school of practitioners ; and if this course, which met with such general approval, be pursued further, the Annual Meetings of the Central Society of German Dentists may very soon be changed into a School of Practical Dentistry.

In this manner, the various methods of filling teeth with gold were practically demonstrated on patients by Hrn Döbbelin of Königsberg, Garke of Charlestown, Heider of Vienna, and Zeidtmann of Frankfort; each of the gentlemen named being surrounded by colleagues who followed the separate stages of the operation with marked attention.

The treatment of irregularity of the teeth was illustrated by many cases which had occurred in the practice of gentlemen present; several casts, together with the apparatus in question, being exhibited. The indications for extracting teeth for the purpose of regulating the dental arch were discussed, and reference made to the care necessary in order to avoid any disturbance in the symmetry of the teeth; and with regard to mastication, the importance of securing an accurate antagonising of the upper and lower molars and bicuspids. As sufficient time could not be spared for the further consideration of this important and extensive subject, Hr Fricke made the following proposition, which was adopted: "That the members should prepare casts of rare and interesting cases of irregularity, together with patterns of the apparatus used in their treatment, and also casts of the mouth when regulated, and forward them with a description to the Central Society, thus establishing the basis of a collection which the members could consult when new cases presented themselves."

It would be exceeding the limits of a correspondent's article, were we to attempt to enter upon all that was introduced and discussed. As regards the reports, we would remark that the Treasurer's account was most favourable. The thanks of the meeting were unanimously accorded to the Treasurer, Hr Schultz.—The Society's Journal was in a satisfactory state, and it was resolved to conduct it as heretofore. Hr Ad. zur Nedden being unable to attend the meeting, the President read a paper sent by him on the Educational question. Its first head referred to the drawing up of a pamphlet, in which the state of the Profession in the separate German States should be comprehensively treated; and it was unanimously resolved that Hr Ad. zur Nedden be requested to undertake the elaboration of this pamphlet by the next Annual Meeting.—The writing of an essay on the care of the teeth and mouth appeared to be of such importance to the meeting, that it was determined to give a prize of forty thalers in gold for the best that should be written; the essays, which are not to exceed two printed octavo sheets, to be sent in to the Committee of the Society before the end of April, 1862; the prize to be awarded at the next Annual Meeting. It was also determined to give a second prize of forty thalers at the next Annual Meeting for a new instrument, apparatus, or professional requisite—the invention or improvement to be thoroughly established. In reference to the participation of the Society in the London Industrial Exhibition of 1862, it was considered that the Society of itself could not take part in it; but it was very desirable that individual members should participate, in order to represent the Profession in Germany; that specimens of all the requisite dental instruments and utensils should be fitted up for exhibition; yet it was thought desirable that no entire or partial dental substitutes should be exhibited, as these can only be tested and judgment formed of their adaptation and usefulness in the mouth, and not merely by inspection.

Many of the questions proposed for consideration were not discussed, the time not being sufficient, notwithstanding that nearly the whole day, from eight in the morning to six in the evening, was devoted to the business of the meeting.

Vienna was selected for the next Annual Meeting. The same Office-bearers and Secretaries were re-elected, the latter receiving the thanks of the Society for their kind and active assistance; 24 Ordinary Members were elected; and it was determined that the Diploma of Corresponding Membership should be forwarded to 39 Foreign Members.

Several Members presented the Society with casts of rare cases, interesting dental anomalies, pathological specimens, and various books.

The members parted with regret, and we are convinced that those few days spent in Dresden will be ever memorable to all who were present, not through the list of attractions and pleasures in which Dresden abounds, and the enjoyment of which the object of the meeting would not permit, but memorable through the prevailing zeal displayed for the interests of the Profession, and the feelings of true reciprocal cordiality which animated the meeting. After the enjoyment of such true brotherly intercourse, the members separated with the hope of meeting again at Vienna in the course of the ensuing year.

Thus closed the meeting of a Society which, though it has scarcely been called into existence two years, furnishes the fairest proof of the adage, "*Concordia res parvæ crescunt.*"

DINNER TO THE PRESIDENT OF THE COLLEGE OF DENTISTS.

On Thursday, August 1st, the Council of the College of Dentists entertained their excellent President, Mr Waite, at dinner at the Brunswick Hotel, Blackwall.

For some time past there has been a strong feeling amongst the Members of the Council, that it was incumbent upon them to offer some public recognition of the great services which had been rendered to the cause of Dental Reform by the President of the College of Dentists. It has been very gratifying to all connected with the College, to have a gentleman placed at the head of it whose name, and whose father's name before him, has been so long and honourably associated with the Dental Profession. The assiduous manner in which Mr Waite has discharged the duties of President, the firm and able way in which he has repelled all attacks upon the College, have gained him the esteem and gratitude of every Member and well-wisher of that Institution. It was, therefore, suggested that the Council should invite Mr Waite to a dinner, as the most friendly method of testifying the estimation in which they held the services he had rendered the College of Dentists while holding the office of President.

The party consisted of five-and-twenty gentlemen, including Dr Waite, Dr Richardson, W. Hopkins, Esq., D. Solomons, Esq. of St. Helena, and T. Saunders, Esq., who attended as visitors. It was arranged that Mr Robinson should have presided, but owing to indisposition he was unable to do so, and Mr Hulme, at the request of those present, occupied the chair, Mr Wood, of Brighton, officiating as vice-chairman.

After the usual loyal toasts had been given, the Chairman, in an able and complimentary address, gave "The health of George Waite, Esq., the President of the College of Dentists." The Chairman particularly dwelt upon the long association of Mr Waite's name with the Dental Profession; upon his taking the office of President at a period when the affairs of the College were in a very unsettled condition; upon his having been instrumental in uniting them together, and in enabling them to repel the unjustifiable attacks which had been made against the College. All these were strong claims upon their gratitude, and he hoped that they should long have their worthy President associated with them; and he doubted not that he would ultimately reap the reward of his labours by seeing the College of Dentists firmly and securely established. The toast was received in the warmest and most enthusiastic manner, and must thoroughly have convinced Mr Waite that his labours were duly appreciated by the Council and the Members of the College.

Mr Waite, in his reply, after expressing his warm interest in the successful establishment of an independent Dental Institution, and pointing out that Dentistry was in every respect a special and peculiar branch of practice, one which it was entirely out of the province of the College of Surgeons to regulate and control, went on to show that the existing regulations, which enabled the Council of the College of Surgeons to declare that certain persons were in their opinion fit to practise as Dentists, gave no power whatever of granting a diploma or any licence to practise; and that if the Dental Profession was placed under the surveillance of the College of Surgeons, there was not the remotest possibility of a Dentist having anything whatever to do with the management of his own profession. Until within these few years, the Council of the College of Surgeons was a self-elected body, whose acts were perfectly beyond the control of its members. At the present time the Council of the College of Surgeons is elected by a special class of members, termed Fellows. It is highly improbable that Dentists would obtain the Fellowship; and hence the government of the entire Dental Profession would, under those circumstances, be vested in the pure Surgeon, and the Dentist himself would be totally unrepresented at the Council Board. Mr Waite concluded by heartily thanking the gentlemen present for the cordial manner in which they had drunk his health, and assured them that he would endeavour, in every way that lay in his power, to promote the interests of the College of Dentists, believing that it was the only means by which he could promote the ultimate welfare of the Dental Profession.

The following toasts were proposed during the evening:—

"The Medical Profession," by Mr Haslar Harris, responded to by Mr Waite.

"The Council of the College of Dentists," by Mr Waite, responded to by Mr Perkins.

"Success to the Metropolitan School of Dental Science," by Mr Williams, responded to by Mr Kempton.

"The National Dental Hospital," by Mr Hopkins, responded to by Mr Brenneis.

Dr Richardson proposed "The health of the Chairman," who, in returning thanks, concluded by proposing "The health of Mr Robinson and Mr Tibbs," to which the former responded.

"The health of the Honorary Secretaries of the College of Dentists, Mr Rymer and Mr Hockley," was proposed by Mr Wood. The names of these gentlemen met with a most hearty reception—a compliment which they have most fully earned by the unremitting attention they have paid to the interests of the College.

Mr Waite proposed "The health of the Visitors," which was acknowledged by Mr D. Salomons.

The dinner was served in a most excellent style, under the experienced superintendence of Mr Lovegrove, and the guests paid due honours to the variety of dishes placed before them. The meeting passed off with the greatest cordiality and good feeling; and it must have been very gratifying to the worthy President of the College of Dentists to find himself for once the centre of good fellowship and conviviality, after the many unmerited and false attacks to which he has been of late exposed.

We regret that the above report of the dinner to the President of the College of Dentists should have been unintentionally omitted in the last number of the REVIEW, owing to the arrival of our correspondent's account of the American Dental Convention when the journal was made up for press.

COLLEGE OF DENTISTS OF ENGLAND.—On the evening of Tuesday, October 8th, the first Conversazione of the ensuing Session will take place, and an opening Address be delivered by the President.

METROPOLITAN SCHOOL OF DENTAL SCIENCE.—The opening of the School will take place on the evening of Thursday, October the 10th, when the Introductory Address will be delivered by Dr Richardson, at 8 p.m.

QUARTERLY DENTAL RETROSPECT.

JULY TO OCTOBER, 1861.

I.—*Case of Successful Treatment of Congenital Total Cleft Palate by Operation.*—By Professor LANGENBECK, Berlin. ('Medical Times and Gazette,' July 20, 1861.)

The patient, a boy aged fourteen, was born with a cleft of the left lip and total cleft of the hard and soft palate, together with the left alveolar process. The operation of hare-lip had been done soon after birth, but had failed; and a second operation, made about a year afterwards, had been successful. On February 6, M. Langenbeck united first the cleft of the soft palate by means of a needle-instrument especially invented by him for this purpose. On May 11, he closed the hard palate in the following manner:—Close to the edges of the cleft, the mucous membrane and the periosteum of the hard palate were cut through to the bone by means of a strong knife, and the edges of the cleft freshed up. By means of a raspatorium placed into these incisions, the mucous membrane and the periosteum were then drawn off and separated by blunt levers from the two halves of the hard palate. Thus, two flaps were formed which were only connected anteriorly with the gums at the alveolar process, and proceeded backwards into the soft palate, which had been separated from the posterior margin of the os palatinum. The edges of these flaps were then united by five silken sutures in the median line, and thus the whole cleft, up to the front teeth, completely covered up. This separation of the mucous membrane of the palate and of the periosteum is troublesome, but can be done without in any way injuring other parts. The hæmorrhage from the vessels of the periosteum necessitated repeated interruptions of the operation, which was, however, concluded in half-an-hour. After the sutures had been removed, which was done in the course of the second week, the cure by first intention was quite complete in the whole extent of the wound. The healed palate is only distinguished from a normal one by a fine cicatrix visible along its whole extent, and a slight indentation at the top of the uvula. In another case of total cleft, in a woman aged twenty-four, who came under M. Langenbeck's care a fortnight afterwards, he performed staphyloraphy and uranoplastics in the same sitting, and with the best result.

The correspondent of the 'Medical Times and Gazette' having spoken of the above as a new operative proceeding, and observing that a complete closing of this malformation has probably never yet been attained before, Mr Hulke, in the 'Medical Times and Gazette' of August 31, makes the following remarks:

"This new proceeding," he says, "has long been very successfully practised by English surgeons, more particularly by my colleague, Mr Fergusson, and Mr G. Pollock, whose valuable contribution to the surgical treatment of this malformation was published in the *Medico-Chirurgical Transactions* a few years since.

The following case, treated by me in 1859, though not completely successful, was sufficiently so to show that, had the patient submitted to another operation, complete union would have been obtained.

2.—*Case of Total Congenital Cleft of the Hard and Soft Palates.*—By J. W. Hulke. ('Medical Times and Gazette,' August 31, 1861.)

Richard B., aged forty, an artisan, was admitted into King's College Hospital on September 12, 1859, with cleft palate. A corresponding fissure in the upper lip had been closed by an operation in childhood. The soft and hard palate were both split. The cleft in the hard palate encroached rather more on the left than on the right of the middle line. It was about half-an-inch across at its widest, and narrowed anteriorly till opposite the first bicuspid tooth, from which point it ran outwards as a linear fissure, through the alveolus, between the right lateral incisor and canine teeth. The roof of the mouth was lofty, and its sides were inclined towards each other at an acute angle. The vomer was deficient. The mucous membrane of the pharynx had the usual dry appearance; the trumpet mouths of the Eustachian tubes were conspicuous. The voice was very weak, and scarcely intelligible. After the sensitiveness of the fauces had been blunted by tickling them for a few days with a feather,

On September 17 Mr Hulke closed the gap in the soft palate by Mr Fergusson's method of operating, putting in five silver stitches. Two of these were removed on the 21st, and the other three on the 24th, when the whole length of the wound had united.

October 1.—The patient went into the country; his voice was but slightly improved.

December 29.—Returned to the Hospital. His articulation was more distinct, and voice so much stronger that he could join in the singing in the chapel.

January 7.—Mr Hulke incised the edge of the cleft in the hard palate with a small Fergusson's knife; and then working in the cut with a stronger Pollock's knife, detached the mucous membrane and periosteum on each side, as far as the alveolar process, working from the front backwards, in order to cut the larger branches of the posterior palatine artery last. The flaps of mucous membrane and periosteum obtained in this way fell together in the middle line without any dragging, their edges even slightly overlapped. Three silver stitches were used; the posterior cut on the third day (owing to the darkness of the afternoon Mr Hulke was not satisfied he had put it in accurately); the anterior was removed on the fourteenth, and the middle one on the sixteenth day, at which time the wound had united everywhere excepting at the junction of the hard and soft palates, where there was still a small hole corresponding to the posterior stitch, of the diameter of a small cedar-pencil. This Mr Hulke intended to close after an interval of a few weeks, and he believed there would have been no difficulty in doing it; but the patient, who had returned to his employment in Yorkshire, could not get leave of absence. He wrote to tell him of the great improvement in his voice, and to express his gratitude.

The separation, says Mr Hulke, of the mucous membrane with the periosteum of the hard palate from the bone is always attended with free bleeding, but though so many vessels are necessarily divided, yet the flaps are amply nourished through the continuity of their attached borders with the gum. It is probable that the flaps do not perish from want of blood, but that their gangrene, which has deterred so many Surgeons from prosecuting further attempts to close clefts in the hard palate, is favoured, by the use of blunt levers and raspatories, by which the tissues are bruised and injured much more than when they are more cleanly cut away with a sharp knife, the edge of which is kept against the bone; by the dragging of the flaps by the stitches when they have been insufficiently separated from the bone; and by the restriction of the patient to a very low and insufficient diet, as is too generally enforced, instead of a liberal supply of nourishment after the operation. The free supply of blood which the denuded bone receives from the periosteum clothing its upper surface, prevents its necrosis.

Total clefts of the hard palate running out through the alveolar process anteriorly, are more favourable for operative treatment than lesser clefts involving the posterior part of the hard palate only; because, in total cleft, the roof of the mouth is lofty, and larger flaps can be gained than in partial posterior cleft, where the palatine arch approaches more closely the natural curve.

3.—*Case of Necrosis of the Upper Jaw in a Lucifer-match Maker.* (Medical Times and Gazette,' July 20, 1861.)

Frederick S., aged twenty-eight, was admitted an out-patient, under the care of Mr Coote, a few weeks ago. He then had great swelling of the right cheek; and just below the eyelid was a sinus, leading to diseased bone. The whole of the upper jaw on this side was found to be more or less diseased. The bone on the other side was also, to some extent, affected. He could scarcely breathe through the nostrils. He had been a lucifer-match maker for eighteen years, but only began to suffer from it three years ago. He had no other special symptoms further than those general constitutional ones due to the irritation and discharge of the local disease mentioned. The smell was fetid and disgusting.

He was subsequently admitted an in-patient, under the care of Mr Wormald, who, on July 9 last, removed the whole of the upper jaw, with the exception of the part forming the floor of the orbit. By one long incision by the side of the nose and through the lip, he was enabled to expose and remove the disease. The man has since progressed favourably.

4.—*Case of Sub-periosteal Extirpation of both Superior Maxillary Bones on account of Phosphorus Necrosis.* By M. Maissonneuve.—('Bulletin Général de Thérapeutique Médicale et Chirurgicale,' May, 1861.)

Eliza Pech, 23, had been engaged for 3 months in a lucifer-match manufactory. When she commenced this employment, she had two or three carious teeth. After a few weeks she began to have pains in the upper jaw, which were followed by swelling, which a medical man whom she consulted looked upon as a dental abscess, and treated with emollients and astringents. By degrees the swelling extended to both sides of the upper jaw, accompanied by violent shooting pains, &c. The patient continued in this state for about six months, when the disease became worse, and she entered the Hospital Cochin on November 10th, 1848.

On examination, M. Maissonneuve found that both superior maxillary bones were attacked with caries and necrosis. It was difficult to define the precise limits of the disease. The enormous suppuration, the extreme fetidness of the discharge, and its mixture with the food, had so emaciated the patient that her life was in great danger. It was explained to the patient that the only chance for her consisted in extirpating both maxillary bones. The operation was consented to, and was performed as follows:—

A semicircular incision, with its convexity directed forwards, was made so as to separate all the soft parts within the dental arch from the roof of the mouth as far as the velum palati. The flap resulting from this incision was detached by means of the fingers and a spatula, and was left adhesive to the velum. A second incision was made in front of the dental arch, and served to detach the maxillary bones from the surrounding soft structures. This separation was continued by means of the scissors, the bistoury, and the fingers, as far as the malar bone on either side, and as far as the nasal bones and the orbits. The bones having thus been set free without making any external incision, the operator placed one blade of a Liston's forceps into the mouth and the other into the nasal fossa, and divided the maxillary bones, which were already partially separated by the disease and were somewhat loose. It was then easy, by means of a few movements, to loosen them completely, and to remove them. The bones which were removed consisted of, 1, the whole of the left superior maxillary bone and a part of the left malar bone; 2, the whole of the right superior maxillary bone, with the exception of that portion which contained the last molar tooth; 3, the vomer.

This enormous internal wound was closed up by the palatine flaps, which had been previously dissected off, and which were united to the posterior portion of the lips and the inner surface of the cheeks by sutures. Very little blood was lost during the operation; the sufferings of the patient were very severe; the operation took altogether twenty minutes, including the insertion of the sutures.

The union of the palatine flaps with the other soft structures was only partially accomplished by the first intention. For three weeks there was a very considerable amount of suppuration, but it was not really so offensive as before the operation. Some portions of bone were detached subsequently, and the cicatrisation was complete in about four months.

The general health was re-established, and the patient recovered her usual appearance. In the region of the gums a resisting osseous tissue was formed, which to a certain extent supplied the place of the dental arch, and enabled the patient, if not to masticate hard substances, at least to eat bread and soft meats, and ultimately to nourish herself in the ordinary manner.

The girl was for some time an inmate of the hospital, and was perfectly restored.

5.—*Case of Extensive Ecchymosis following Wound of the Cheek.*—By Mr Brownfield, Poplar Hospital. ('Medical Times and Gazette,' July 27, 1861.)

The following case is curious as showing extensive ecchymosis from a small and limited wound. A man, aged seventy-two, was admitted on February 9 into the Poplar Hospital, under the care of Dr Barr, for fracture of the angle of the lower jaw on the left side. The injury was caused by a cask falling against the jaw. Soon afterwards the ecchymotic swellings appeared about the jaw, and spread in irregular patches under the skin of the neck and on to the chest, and also upwards on the cheeks and to the opposite lower eyelid. The mucous membrane of the hard and soft palate was also very much distended. The effusion was about an hour in arriving at these limits. The swellings have since gradually subsided, leaving irregular reddened patchy stains.

6.—*Case of Fibrous Tumour of the Antrum, extending through the Hard Palate to the Mouth; Successful Removal.*—Mr Fergusson. ('Lancet,' August 31, 1861.)

The patient in the following complicated case was the subject of two tumours, one situated in the right cheek, the other in the antrum and roof of the mouth. The growths were, however, perfectly distinct from one another. Both were removed at a single operation, which has been attended with the best results. From some remarks made by Mr Fergusson at the time, we learned that he had seen the patient twelve months before, and the disease then presented so malignant an aspect that he dissuaded her from undergoing any operation. Some months later, the disease in the mouth was found to be an ulcerated, sloughy-looking mass, and the finger could be readily passed alongside of it into the antrum. Perceiving that its progress had been slow, and that it was within the reach of surgical aid, he thought he would give her a chance, more especially as there was no development of disease in any other situation, and the tumour in the cheek was quite distinct from that in the jaw. The steps of the operation are detailed in the notes of the case furnished by Mr G. Fortescue, house-surgeon to the hospital. Mr Fergusson could not accomplish all he wished in regard to the incisions which he ordinarily practises, inasmuch as he had not only to remove the upper jaw, but also the soft palate, besides the tumour in the cheek. The passage of the right nostril was free, for the tumour had not extended far in that direction; nor did it involve the orbit.

M. C., aged thirty-eight years, a domestic servant, unmarried, of good complexion and healthy appearance, admitted April 27th, 1861. On admission, the right side of the face was extremely deformed and prominent. The prominence was due, in great measure, to a tumour imbedded in the right cheek, in front of the masseter muscle, about the size of a hen's egg, hard, smooth, and movable, with the skin over it natural and unadherent. On looking into the mouth, a foul ulcerating growth was seen protruding through the hard, and involving also the soft palate of the right side, which were both bulged downwards towards the floor of the mouth, extending backwards to the anterior pillar of the fauces, and encroaching to some extent on the nostril of the same side. The orbit was not concerned in the growth, and the eye appeared natural, but occasional attacks of double vision were complained of. The glands beneath the jaw were not affected. The history of the affection was somewhat obscure; but the first symptom of disease in this locality occurred (she said) some thirteen years ago, as a swelling in the throat about the right tonsil, commencing without pain, but soon impeding the power of deglutition, which was regained, however, after the growth had been cut into by a surgeon. Soon a tumour began to appear in the right cheek, and, growing for six years, was removed by the knife seven years ago. The duration of the present disease seemed very uncertain: it had existed, however, for several years, and of late its progress had been rapid.

May 4th.—Chloroform was administered, and Mr Fergusson proceeded to remove the disease. An incision was made through the upper lip, near the middle line, into the nostril, carried upwards along the ala of the nose, and, finally, taken horizontally outwards upon the malar bone, close beneath the margin of the orbit. The flap was dissected up, and the tumour, after a very few touches of the knife, squeezed out from the cheek. A tooth was then removed in front, and the saw carried upwards through the hard palate, and transversely below the orbit, cutting through a portion of the malar bone, together with the superior maxilla. Next the cutting pliers were used freely, and the mass removed piecemeal. Some soft diseased tissue remaining behind was cut off with the curved scissors. The bleeding, free as usual in these cases at first, ceased speedily of its own accord. The wound corresponding to the division of the upper lip was brought into apposition by two hare-lip pins, the remainder by interrupted sutures. Very little disfigurement resulted from the operation. During the proceedings on the mouth, the effect of the chloroform was kept up very successfully by Dr Sansom, by means of an india-rubber tube introduced through the disengaged nostril.

7th.—The wound, kept covered with water-dressing, is rapidly uniting; the mouth is washed out frequently with myrrh and tannin gargle; she seems to suffer little, and takes liquid food well. The pins removed from the lip.

9th.—The sutures removed; the wound almost entirely healed.

17th.—Union of the horizontal incision delayed by the formation of a small superficial abscess beneath it, which has been opened, and has refilled several times in succession. The lower eyelid appears slightly œdematous.

27th.—The incision healed. The wound inside the mouth is granulating up, and a very slightly perceptible falling-in of the cheek remains. She takes solid food without difficulty.

May 5th.—Discharged.

July 16th.—The patient presented herself for examination to-day. There has been no return of the growth. The deformity is barely noticeable. The excavation is for the most part filled up, and a slight depression in the roof of the mouth, with a small, irregular aperture in the palate, alone mark the site of the operation. Some œdema of the right lower eyelid remains.

The softer part of the disease appeared, on microscopical examination, to consist mainly of a fibro-granular matrix, containing numerous corpuscles, round, regular, of uniform size, granular, and with no appearance of nuclei. The much firmer tumour of the cheek contained corpuscles of a similar character, with a larger proportion of the fibrous element.

7.—*Case of Cyst in the Antrum, punctured on two occasions; Cure.*—Mr Bryant. ('Lancet,' August 31, 1861.)

Eliza F., aged forty, applied with a tumour in her right cheek, of one year's growth. It was evidently an enlargement of the antrum, and, from its globular form, appeared to be cystic. Mr Bryant introduced an exploring trocar and canula, and drew off two ounces of the peculiar glairy fluid characteristic of these cysts. The fluid, however, subsequently returned, and after the lapse of three weeks a free opening was made above the bicuspid teeth and within the mouth, giving exit to a quantity of fluid similar to the last. The cavity was plugged with lint. Inflammation followed, and some suppuration, which has resulted in the contraction of the cyst-wall, and a perfect cure.

She was seen three months afterwards, and no return had taken place.

8.—*Case of Tumour beneath the Lower Jaw; Successful Removal.*—Mr Holthouse. ('Lancet,' August 31, 1861.)

An elderly female presented herself at the Westminster Hospital, having a tumour situated under the lower jaw in the right mylo-hyoid space. It had been present for six years, and latterly commenced to grow rapidly. It was movable, and apparently unattached to any important structure; Mr Holthouse therefore determined upon its removal. On the 21st of May chloroform was given, and an incision made over the growth, which with the aid of the handle of a scalpel was readily enucleated. Although no vessels of importance were wounded, yet there was free bleeding. The tumour was apparently an enlarged gland, but strongly resembling an albumino-sarcomatous growth. The patient made a good recovery, and left the hospital well.

A few weeks later, we noticed a somewhat similar case under Mr Erichsen's care at University College Hospital, in the person of a young woman with a tumour in the left mylo-hyoid region. It was attributed to enlargement of the glands in that situation from the presence of decayed teeth, and had resisted the means (chiefly iodine) employed for its absorption. The tumour was superficially situated, as large as an elongated fowl's egg, was movable, and its anterior surface coursed over by a large vein. Mr Erichsen believed it might be an enlarged tuberculous gland undergoing calcareous degeneration, and so it proved on removal, under chloroform, on the 12th of June. In this instance also a good recovery resulted.

The situation of both of these tumours was over important parts, yet, as it was comparatively superficial, the operation in each was unattended by any danger.

9.—*Case of Congenital Cystic Tumour in the Lower Jaw of an Infant; Removal.*—Mr Coote. ('Lancet,' August 31, 1861.)

A curious case of congenital deformity of the lower jaw was brought to this hospital, about three months ago, in an infant six months old. The right half of the bone was enormously enlarged, and occupied a prominent position in the neck, extending downwards as far as the chest. It appeared to invade the entire bone, but was really confined to the right side. Its increase had been rapid since birth, and as it was still enlarging, it became necessary to do something to afford a chance for life, as, if left alone, suffocation would have ensued in a short time. Accordingly, chloroform being given, an incision was made by Mr Coote upon its outer part, and a thin shell of the expanded jaw-bone reached. This was opened, and the interior was found to be filled with a regular nest of cysts, one placed within the other, all of which were removed, and the cavity closed with lint. Very little blood was lost during the operation, and for a few days afterwards the child improved very much in health, although necessarily weak, and the great swelling of the neck was much diminished. Suppuration became freely established, and the drain shortly after began to tell upon the system; for the child became weaker and weaker, although well supplied with wine and good nourishment, and finally died from exhaustion.

Had a much earlier operation been resorted to, it is but reasonable to infer that a more fortunate issue might have resulted. We place the case upon record, inasmuch as, however common fissure and other deformities in the upper jaw may be, they are seldom seen in the lower.

CORRESPONDENCE.

PROFESSIONAL ADVERTISEMENTS.

TO THE EDITOR OF THE DENTAL REVIEW.

Sir,—I have perused your article on Dental Advertising in the last number of the Review with considerable interest, and I cannot but think the Profession is much indebted to you for grappling with a confessedly difficult question in so able and fearless a manner. It was high time prominent attention should be directed to this subject; for, what with the high ground taken by those who denounce open advertising without distinction or reserve—but who, in many instances, were themselves floated into notoriety by means of such advertisements in their start—and what with the impudent puffs of the charlatan, the middle-class *competent* man, with little or no influence, has but small chance of success, unless "a modest form of advertisement, in which nothing false or fraudulent is stated," be allowed.

I have no personal interest in supporting the reasonable view of the case taken by you, and it is only in behalf of a respectable portion of the Profession that I venture to protest against the proceedings of these, whether Members of the College of Surgeons, of the College of Dentists, or of any other College, Society, or Body, who would withhold bread from their fellow-practitioners because they may happen to have plenty themselves and want more. To secure the superfluity, they think it desirable to do their best to put the extinguisher on all lights but their own. Amongst the foremost of this class are Dentists who possess a knowledge (in some instances a mere *smattering* in others) of the science of Dentistry, and who avail themselves of a ready pen and a fluent tongue to let the Medical Profession, and *through it* the public, into the secret of their talent. Thus their *books* are circulated, and their *speeches* printed. I ask these gentlemen a simple question—Is this, or is it not, *advertising* of a profitable kind? I think the candid answer must be "Yes." If so, why so hard on others who as practical Dentists they know to be at least their equals, but who do not possess the vulgarly-termed "gift of the gab," and who therefore (until fairly established in business) have recourse to a plain, *straightforward* advertisement?

In conclusion, Sir, I would say that when once a Dentist is in successful practice, the necessity for advertisements has ceased, and therefore they should be left to those who have need of them. It is gratifying to find that out of the 130 Members of the College of Dentists, only 30 find advertisements at all necessary, 100 being in a position above the requirement; and I find, on inquiry, that even of the 30 gentlemen who are said (by the 'Lancet') to advertise in an unprofessional way, nearly the whole of their advertisements are confined to a statement of name and address, or the same with local appointments. At any rate, the 'Lancet' has unwittingly done good service to the College in this particular: it has been the means of proving that the great majority of the members do not need to advertise at all, and that those who do (with scarcely any exceptions) merely state that which is necessary, in an honourable way.

I am, Sir, yours respectfully,
A MEMBER OF THE COLLEGE OF DENTISTS FROM THE FIRST.

September 23, 1861.

TO THE EDITOR OF THE 'DENTAL REVIEW.'

SIR,—I have observed with much concern the waste of space in answering the vapid charge brought against the Executive of the College of Dentists—that of encouraging advertising in the Dental Profession.

Let it be fully understood, that I consider advertising a great evil; and did the charge against the College emanate from a respectable source, it would have been its duty to make a good defence. But when we know that the splutter comes from the rump of the seceders—from those who, whatever they may possess, have no other object but to annoy,—it does seem to me that the space occupied in "battling with the shadow" is wasted, and might be more worthily occupied. To those who know the origin and progress of the publication known as the 'British Journal of Dental Science,' the puny and struggling efforts to create a sensation are met with the most exuberant laughter;—first started by a blunderer—fostered by the College until it became of value, when it was sold to the highest bidder—since which it has been the vehicle of slander under the conduct of the most unscrupulous editorship, and is now a bye-word and an opprobrium! I pray you, therefore,—and I am not singular in the request,—let the 'British Journal' have its say; and let it say it as it will, over and over again, but give it no reply: "Touch pitch, and you will be defiled." Every reflecting man knows the object of the 'Journal:' *the College is established—is firm!*—"that's the grief!"

As to the propriety of advertising, there can be but one opinion on the subject—that it were better let alone: but there are positions in which a beginner is placed that compel him to have recourse to publicity; and if he advertise his place of residence and his hours of business only, no great harm is done. Some of the supporters of the

'Journal' have done so; nay, if report speaks truth,—and I think it does,—a very distinguished member of a would-be aristocratic society not only did it, but had a "sandwich" walking up and down the Blackfriars road for months!

But what *is* advertising? Many only use the quarterlies; others patronise the papers; a great many perpetrate a book, advertise it well, and do not forget to inform the public that the author has the nominal appointment at such and such an hospital, and that he lives in such a street or square. Where is the difference? In the present day, advertising is the rage. The Queen's Jeweller advertises; the Queen's Dressmaker advertises; and the Queen's Dentist did it. *We* who do not advertise—for the very good reason that we can do without it—wish to see it put down. But how is it to be done? Will the sapient 'British' say?

As to the charge against the College of fostering advertisers, and admitting *known* advertisers to the Membership, the charge is false, and the writer of the charge knows it to be false; and that it is false, my position in the College enables me to say without the least hesitation, as I have seen every name *on which there has been known* to be the slightest taint *invariably rejected* by the Council.

I do trust, Mr Editor, that for the future no notice will be taken of the ravings of the Journal above mentioned, and that the space hitherto allotted to "replies" be turned to useful account.

I am, Sir, your obedient servant,
THEODOSIUS PURLAND.

TO THE EDITOR OF THE 'DENTAL REVIEW.'

SIR,—The success which has hitherto attended the sale of the Dental Certificates of the College of Surgeons, coupled with the experience and probable qualification of many of the purchasers, afford grave matter of consideration to the really experienced, conscientious, and practical Dentist. It is true that amongst the first batches of purchasers were several Dentists of established and acknowledged reputation, and to whom the possession or non-possession of a Dental Certificate of any kind, further than that of their established reputation, could not be of the slightest consequence; and their reception of the Lincoln's-inn document simply involved an exchange of ten pounds sterling, and an almost valueless piece of paper—or, in other words, the Dentist threw his money into the treasury of the College of Surgeons, and received in exchange that which, in all probability, will in most instances never produce him, directly or indirectly, ten pence. Still, if a man chooses to lay out his money injudiciously, so long as he alone endures the loss or inconvenience thereof, I do not know that it is a matter for the serious interference of any one: but when, on perusing the more recent lists of certificated Dentists of the College of Surgeons, I find there are many that I and my friends to whom I have spoken on the subject have never heard of previously,—as well as some who, it is well known, were the proprietors of chemists' and druggists' shops, and carrying on business in them, only a few months ago,—it becomes a much more serious fact than that of a man foolishly spending his own money. By subjecting men to a verbal examination on a subject of which they have little or no practical experience, but which subject may be sufficiently learned in *theory* to pass the miscalled examination in the course of a few weeks, and granting such men certificates of competency to practise as Dentists, a real injury is inflicted on men who have fairly learned their profession, as well as on the public generally. The Profession is scandalised by the blundering of such pretenders, and those patients who go to them get little else but disappointment for their cash. With regard to the mechanical department of the Profession, many of them know really nothing; some of them, to my own knowledge, have applied to Mechanical Dentists for a "few pieces of artificial teeth that would be likely to come in, cases of twos and threes, and what people would be most likely to want."

Such persons, of course, soon learn that teeth cannot be fitted into mouths on the same principle as ready-made clothing is fitted to the body, and ultimately learn to place pieces, *properly made for them*, into the mouth;—but is it to *such* men that a certificate of competency to practise should be given?

It is quite clear that the authorities in Lincoln's-inn Fields ignore the question of mechanical qualification, if not entirely, very nearly so: ten pounds, like charity (it would appear), covereth much imperfection, and so blunderers are licensed to learn their profession on the jaws of their patients. This is not as it should be. The public *cannot* alter it; the Dentists *can*, and ought to do so, for their own interest and reputation.

The plan is a simple one. Let every Dentist who does not at present belong to any Dental Society, join *that one* which has for its object the independence and entire management of the Dental Profession. The effect of such a combination would be to obtain in a very short time a Charter for the College of Dentists, which would give a power, not only of putting every candidate for the membership through a thorough and practical examination, but also to prevent the public from being imposed on, and the usefulness of the Profession being misrepresented.

As an illustration of the above plan, I may mention that something like 130 persons have received the College of Surgeons' Certificate: they have, in paying for it, added to the funds of that Institution the sum of 1,300*l.*, for certainly no absolute benefit at all, but rather the reverse, as I have endeavoured to show. Now, if the 1,400 or 1,500 Dentists in the United Kingdom would come forward with their ten pounds each to obtain a Charter of Incorporation, there can be no doubt that, not only would the Charter be quickly obtained, but that the Profession would become really respectable and respected, and quackery almost impossible.

Let the Dentists themselves work truly for themselves, and the true interest of all will be attained.

I am, Sir, respectfully yours,

A SINCERE WELL-WISHER TO THE PROFESSION.

P.S.—I have lately heard that there are, at the present time, several Chemists and Druggists in the neighbourhood of Camberwell who are grinding for the Dental Examination at the College of Surgeons, and who expect very shortly to be able to exhibit their *certificates* to their innocent patients.

Dentists should be up and doing, and remember that he who would have his interests well attended to must attend to them *himself*.

TO THE EDITOR OF THE 'DENTAL REVIEW.'

SIR,—Of all men in the world who are honoured or who honour themselves with the term "Professional," the Dentists are without doubt the most noisily ridiculous about their gentility and respectability; and if the public take any interest at all in their disputes about the aforesaid qualifications, I am afraid the conclusion that they will be forced into will be to doubt the existence of anything like gentlemanly feeling amongst them.

For four years has one party striven to effect reform and produce union amongst them; and for the same length of time has another party, who is continually proclaiming its *superior gentility*, been opposing, with all its might and spite, every effort made in that direction. Month after month does that genteel party give its mind to "evil-speaking, lying, and slandering" against those who do not speak as it thinks, who cannot act as it acts—who would be but too happy to go on quietly in the path of science and true reform, if those noisy individuals who monthly advertise their own gentility would withdraw the advertisements and *behave* like gentlemen. "Good wine needs no bush:" a *gentleman* need not *tell* the world what he is; his conduct will speak for him: but if his conduct will not proclaim him a gentleman, he finds it necessary to advertise that fact. Hence all this periodical hubbub about who is the genteel party.

Amongst the many dodges to which these gentry have from time to time resorted, none seems to have lasted so long or served them so pleasantly as the howl against advertising members of the College of Dentists; and to give it the more effect, they have lately engaged the 'Lancet' to assist them.

Now, without attempting to dispute the correctness of the list of advertising members of the College of Dentists as given in the 'Lancet,' I would merely suggest to its Editor, that if he must go out of his usual course to publish advertising Dentists, he ought in fairness to publish a list of Members of the *College of Surgeons* who advertise. The Profession and the public would then see that neither the qualification of an M.D., nor the new *ten-pound* Dental qualification of Lincoln's-inn Fields, has sufficient virtue in it to prevent the vulgarity of advertising all sorts of medical unmentionables. The attention of the Editor of the 'Lancet' has been directed to this fact on a previous occasion; but in pouring out his wrath against a *particular party* of Dentists, he has evidently none left for sinners of his own Profession. With regard to the practice of advertising, about which so much noise is made, a question naturally arises as to whether it is reputable or disreputable. To advertise a fact which cannot injure any person, but which, on the contrary, may benefit many, does not convey to an unprejudiced mind a sense of immorality or want of respectability on the part of the person who so chooses to communicate to the public; nor does society look upon men who have made fortunes in their various trades or professions, or what not, chiefly or entirely through the medium of advertisements, with anything akin to disrespect. Let me ask those worthies who are just now raising their untuneful voices so much against the publication of a man's calling, whether some of the richest—ay, and some of the most respected and respectable—men in the City of London have not chosen the advertising road to fortune; and, further, whether any man in his senses thinks them any the less respectable for having done so. "Oh, yes," I may be answered, "that's all very well; but then they are only tradesmen and shopkeepers, while we are professional." Good; worthy masters, most true and just; but where is the difference between us? Neither of us has enough to enable him to live as he would like, unless he will work for more: we therefore *both of us*, with a most praiseworthy industry, *do* work, and do honestly (I hope) gain more. Does society honour a man who has gained a fortune by repairing and rebuilding human teeth, any more than it does one who has gained a fortune by repairing and building houses, or by buying and selling this or that material? So long as he has conducted himself towards his fellow-man with honour and integrity, his fellow-man, in whatever station of life he may be, will think well of him, and will not blush to own him as a friend. And that this assertion shall not lack proof, I will just refer those who may presume or pretend to doubt it to the list of Lord Mayors of London, who are generally, I believe, considered to be gentlemen, in which will be found *tradesmen* of almost every kind, and with whom even Royalty itself does not disdain to dine. Compare this fact with another which I once witnessed, and which I will relate. I was once in company with a number of Dentists, when the question was mooted, "whether members of the Dental Profession who kept Dental Depôts ought to be admitted as members of the Dental Society?" The question, as might be expected, elicited two kinds of opinion, although no very strong one either way, until a *gentleman* present, whose brother is a *printer*, declared that those who kept depôts were *tradesmen*, and that himself, who was a *gentleman*, could not sit in company or dine with a tradesman. This, of course, was conclusive. The only inference that can fairly be drawn from these two pictures is, that traders or tradespeople are fit to sit and dine in company with Royalty and the greatest in the land, but *unfit* to sit and dine with Dentists.

But to return to the advertising question: I think that I have shown, by what has been already stated, that there cannot be anything disreputable in the simple act of advertising. If there is anything disreputable, then, in advertisements, it arises from the nature of the statement made, and not in the fact of the statement being advertised.

I hold, then, that advertising is not in any way wrong or disreputable, unless it is made use of for the purpose either of deceit and falsehood, or for the equally reprehensible purpose of taking an unfair advantage of one's Professional brethren. The simple advertising of the fact that a person of a certain name is a Dentist, and that he is to be found at a certain specified residence, where he will be happy to receive patients at specified hours, is, in my opinion, perfectly compatible with all that is respectable or professional; and with young members of the Profession more especially is such an advertisement absolutely necessary. But when, in addition to name, residence, and profession, is attached a statement which is in itself grossly false, or, although carrying on its face the aspect of truth and candour, is intended and used for the purpose of deception,—this is not only disreputable, but dishonest, and ought to be discountenanced, and, as far as possible, put down. Again, if to the name &c. be added a statement to the effect that the advertiser sells his services at one-fourth or considerably less than that usually charged by respectable Practitioners, he, the advertiser, is guilty of unfairness to his brethren, and ought not to be countenanced or encouraged.

There are many ways of indirectly advertising; such, for instance, as the writing and publishing of a book—writing letters to newspapers and periodicals, in which statements very much exaggerated or palpably false are put forward: and this sort of advertisement is very often made use of by those very gentlemen who find fault with advertising as a principle. There were, for instance, some very curious assertions of this kind which made their appearance in some of the daily papers, when electricity was announced as a local anæsthetic in tooth-drawing: and such statements might have still been put forward, had it not been for the thorough investigation of the subject that took place at the College of Dentists, and which resulted in giving the quietus to all false assertions on the subject.

I would further observe, that that which is wrong in principle is wrong at all times; and that if advertising is bad *now*, it was also bad when some of those gentlemen advertised who now join in the great cry against it. They should recollect that one man has as much right to a public way as another, and that he who has been seen in a doubtful neighbourhood should not be too censorious upon his friend who may be found in the same neighbourhood some time after he (the censor) has left it.

In conclusion, I would very respectfully address a few words to the Editors of Medical journals generally; but as the 'Lancet' has been more than usually *sharp* lately in directing its edge against Dental advertising offenders, I would more particularly call its attention to these my concluding words.

It has always been considered in law, and held to be just by sensible people, that an encourager of crime is a greater criminal than he who commits the crime; and that he who harbours bad characters, and profits by their deliquency, is the worst character amongst them.

Receivers are worse than thieves, and publishers of evil are worse than the writers of it. For if there were no receivers, thieves would be scarce; and if there were no Editors of Medical and other periodicals who would, for a trifling pecuniary gain, publish objectionable advertisements, these objectionables would never offend the eye or feelings of any but the virtuous Editors to whom they might be presented; but who would be amply compensated for any laceration their feelings might endure in the contact, by the withering scorn with which their editorial eyes would annihilate the would-be advertiser.

In a word, let the Medical periodicals refuse to insert Dental advertisements, and forego the profit of them; and then the Profession and the public will believe that they really wish them to cease. But while they outrage common sense by crying out against a nuisance which without their aid would not exist, everybody must doubt their sincerity.

I am, Sir, yours obediently,

September, 1861. A DENTIST.

TO THE EDITOR OF THE 'DENTAL REVIEW.'

SIR,—As a member of the Dental Profession, I beg to tender you my thanks for the very temperate and sensible article which appeared in the last number of your journal upon the question of Dental advertisements. There is, however, one very important phase of the Advertising question which appears to me to have been insufficiently dwelt upon, even by yourself, and has been completely ignored by your opponents. I allude to the position of the country practitioners; and as these gentlemen probably number three times as many as Town Practitioners, they can scarcely be regarded as an insignificant portion of the Dental Profession.

I am myself in practice in a tolerably large country town; and in the immediate neighbourhood are a number of smaller towns, at some of which markets are held. Besides these third- and fourth-rate towns, there are numerous villages and isolated homesteads, to all of which one of these market-towns forms a centre. Now, it is well known that the market days are chosen by country families for transacting any business that may arise out of their own personal or domestic matters, and which involve the necessity of visiting one of these towns, often some five or six miles away from them. In such localities, even the ailments of the body, unless they are serious, are allowed to stand over till the market-day; and many a tooth has thus escaped for a while the merciless grip of the Dentist, owing to a change of weather giving relief before the day appointed for its extraction. As to having teeth inserted or stopped on any other day than the one appointed, as it were, by custom and public consent for such and all similar transactions, none but the more wealthy, who have carriages and horses at their command, would think of doing so. Now, Sir, in the name of common sense, how am I to let those who may desire to consult me know on what days, at what hours, and in what part of the town I am to be found? Am I to be perpetually intruding myself upon the notice of individuals by cards or circulars? Is it not a more reasonable and a more inoffensive plan, to inform all persons indiscriminately of my whereabouts, by simply stating the days and hours of my attendance, and where I may be found in the towns I visit, than by any other means?

Your London Practitioner, with all his pretended contempt for advertisements, places his name before the public daily and hourly; he has, in fact, a standing advertisement, which is in nearly every house in London, or is within the reach of every inhabitant of London. What, I would ask, is your 'Post-Office Directory,' your 'Red Book,' your 'Blue Book,' your 'Court Guide,' but so many standing and widely-circulated advertisements? It may be said, that only the name and address of the individual is inserted. I reply, that to add the days and hours of attendance would be superfluous. It is well known that every day in the week, and from ten to four or five o'clock, your Town Dentist is always at home, sitting at the receipt of custom. Let the Country Practitioner be furnished with an equally efficient mode of placing his name and address, and his hours of attendance, before the inhabitants of the district in which he resides, and I will answer for it that the majority of us would be just as willing to give up the public newspaper as the medium for making himself known, as the most sanctimonious and supercilious of your London Practitioners.

Let us inquire, however, what would be the result of the respectable Country Dentist withdrawing his advertisement. This may be summed up in a few words: first, loss to himself; secondly, injury to the public; thirdly benefit to two classes of Dentists—namely, to the arrant quack, and to a few Practitioners in London and some of the other great towns.

It is impossible to take up a country paper, in any district, without meeting with the advertisements of some of the wholesale London Dental firms, who promise impossibilities, profess ridiculous prices, and, finally, get all they can. These men have their agents travelling about for them in all parts of the kingdom, and visiting all the country towns on the days I have referred to. The agent, whose qualifications are a mere matter of chance, performs what operations are required upon the patients that have been drawn to him by the specious promises of the advertisements put forth by the firm, and obtains what orders he can for artificial teeth. The orders are then forwarded to a firm in London, and, when completed, are brought down by one of the principals, who are seldom willing to trust their agents with the receipt of the money. It would be a waste of time to endeavour to prove that such a mode of practice is injurious to the public, or at least to that portion of it who trust themselves into the hands of these Dental tradesmen.

It cannot be supposed that every individual will remember, or even be aware of, what towns and on what days the resident Dentist attends, unless the latter is permitted to certify the same in the local papers. If it were not for these advertisements, a very large number of country residents would, of mere necessity, avail themselves of the services of the travelling Dentist. The more wealthy inhabitants, and those who belong to the higher classes of society, to whom a visit to the Metropolis is neither disagreeable nor inconvenient, would, on the contrary, go to the London Dentist for assistance; and so between the arrant quack and the *élite*, as they are pleased to consider themselves, of the Dental Profession, the resident Country Practitioner would be left to shift as best he could in an honourable but unprofitable obscurity.

I reman, Sir, your obedient servant,

A COUNTRY PRACTITIONER.

MISCELLANEOUS.

DENTISTRY IN CORFU AND THE IONIAN ISLANDS.—On reaching Corfu, I endeavoured to obtain the information you requested. For that purpose I went into a chemist's shop, and my informant told me that there are only two respectable Surgeon-Dentists in Corfu. Now, there are a great many wealthy people here, and I should think they could find employment for more than that number. Besides the before-mentioned Surgeon-Dentists, I find there are twelve Barber-Dentists, who carry on their trade in the same manner as in our own land in days of yore. With tooth-drawing they combine bleeding, shaving, and hairdressing, and hang out a sign, on which is painted the operator in the act of wrenching a tooth from a man whose features denote great agony (not a very sweet invitation), and an arm bandaged below the elbow, with blood gushing from the punctured vein. I happened to be passing one of these shops just when I observed a man about to have a tooth extracted : I walked in, and watched the operation. It was a double tooth, in the lower jaw. He, of course, sat in a chair, but a very curious one—straight-backed, high, and made fast to the wall. I know nothing of Dentistry; but the operator appeared to me a very clumsy fellow, and the patient's countenance during the operation in no way belied the sign hanging outside the door. The instrument used was, I believe, a very old-fashioned affair. I imagine so, because it was of the same pattern as the first one I ever recollect seeing, and I know that great progress must have been made in the Profession since then. I think artificial teeth are quite mythological contrivances here. In Cerigo there is no such thing as a Dentist, good, bad, or indifferent. The two or three Surgeons of which the island boasts, out of a population of 13,000 people, do all ; so from this you may perceive that the practice of Dental Surgery is in a very primitive state in the Ionian Islands. I have no means of ascertaining its state in the other islands, Cephalonia, Santa Maura, Ithaca, Paxo, and Zante ; but as Corfu is the principal place, and its progress in this respect has been so slow, there is not much to be hoped or expected of the other islands.—*Extract from Private Letter*, June, 1861.

THE SCOTTISH VULCANITE COMPANY'S WORKS. — EMPLOYMENT FOR WOMEN.—Edinburgh is particularly deficient in means of occupation for women. Some of the large publishers and bookbinders in town do indeed employ a few hundreds ; but the North British Rubber Company, at Castle

Mills, is really the only establishment in the city that can be said to afford any great scope for our surplus female labour. At the present time, there are about 400 young women employed here, at wages ranging from 7s. to 12s. per week, and which on the average, allowing for less busy seasons, may be reckoned at 8s. per week the year through.

It is this same company that proposes to increase the debt of gratitude the people of Edinburgh owe them, by opening up a new field for the employment of women.

Within a hundred yards of the Castle Mills Works, and to the west thereof, there has sprung up, with a celerity quite unusual in Edinburgh building, an extensive brick erection, and a giant brick chimney-stalk. It is not many weeks ago since the ground was staked off, and already the highest portion of the building has reached its third storey, while a lower portion has been completely roofed in, its floor laid down, and its glazing finished. This erection is for the manufacture of vulcanite, and the manufacture will be undertaken by the Scottish Vulcanite Company—the partners of which are chiefly American, and, as we have already said, substantially the same as the North British Rubber Company.

The main building is 150 feet long, 40 feet broad, and, to the wall-head, 38 feet high. A roof of 11 feet in height raises the total elevation to 49 feet, and converts a three-storey building into four. In the centre there will be a neat square clock-tower, partly tapered towards the top, and rising to a height (including that of an elegant weather-vane) of 108 feet. On the west side, joining up to this, the main building, there is the engine-house, 30 feet long; and beyond it, the polishing-house, 85 feet long and 10 feet 6 inches in height, surmounted by a handsome and well-lighted overhanging roof. The total length of the building is thus 265 feet. The chimney-stalk will be 150 feet in height, and the whole, it is expected, will be completed in two months from this date. To relieve the minds of those who may object to a flaunting red factory in their midst, it may be stated that the whole is to be coated over and painted to resemble stone.

India-rubber appears to have been introduced into Europe about the beginning of the last century; but little seems to have been made of it until the latter half of that period, when it was used for erasing pencil-marks. Bottles of Indian manufacture found their way into the United States about 1800, and shoes some twenty years later. Experiments began to be made with gum-elastic in the States about 1824, and five years thereafter it became generally known that the gum could be dissolved by the essential oils—a fact that showed how useful it might become. Several large manufactories now sprang up in America for the manufacture of shoes and other articles from caoutchouc; but after the expenditure of immense sums of money they were forced to give the matter up—the principle of vulcanising, by which the material is rendered unsusceptible alike to heat and cold, not yet having been discovered. This important invention occurred in 1839, and was due to Mr Charles Goodyear, an American, who had previously found out a method for manufacturing the gum-elastic into sheets in such a manner as to prevent the surfaces from adhering when brought together, as well as a plan for imparting to the sheets a cloth-like surface.

The history of Goodyear is the history of many a poor inventor. He was looked upon as a crazy individual—a man to be shunned by all respectable persons, and to be described as one "who has on an india-rubber cap, stock, coat, vest, and shoes, with an india-rubber money-purse, without a cent of money in it." But he persevered, and success at last crowned his efforts, although not until after he had endured many hardships—the hardship of hunger, at one time almost bordering on starvation, and suffered much from the injustice and dishonesty of wealthy manufacturers.

There is no end to the uses to which "vulcanite," for the special manufacture of which this new factory has been erected, can be put. Yesterday we saw a very handsome smoking-pipe that had been manufactured out of it, an exquisitely-carved little basket for holding the knick-knacks of the drawing-room, and small-toothed combs of such admirable workmanship and substance that they cannot fail to put buffalo-horn out of fashion very speedily. These were of American manufacture, and they infinitely surpassed some of French construction which we also saw. The patents of the American machinery are, we understand, possessed by the new company, so that an equally good article as the American may be expected to be turned out here. Combs, indeed, will be one of the principal articles of manufacture at the new establishment.

Imitation whalebone, for dresses, stays, umbrellas, &c., will also be extensively manufactured. This, we think, is a most important feature. Whales have been so much hunted that they now seek shelter from the sharp harpoons of our fishermen in the far recesses of the Arctic Seas, into which our vessels cannot hope to penetrate with profit, especially since the introduction of paraffin oil has reduced so much the price of that expressed from the blubber of the whale. There was, therefore, great cause for fear that the supply of whalebone would very soon fall far short of the demand. This alarm need be no longer entertained. The new article possesses all the elasticity of the whalebone without its liability to split, and it will be obtained, we believe, at a much cheaper rate.

Knife-handles which will suffer no injury from immersion in hot water, canes, whip-handles, door-knobs, castors for furniture, &c., will also be manufactured.

Mixed with a variety of substances, hard rubber can be formed into sofas, couches, chairs, bookcases, writing-desks, inkstands, paper-knives, picture-frames, statues, ornaments, and articles of bijouterie of all kinds, bottles, jugs, musical instruments, sword-sheaths, &c. &c. It possesses the hardness of iron, with perfect freedom from corrosion, and less liability to be injured by concussion.

The *employés* in this new branch of industry will be mainly women, of whom it is likely not fewer than 200 or 300 will be employed as soon as the place gets fairly into working order.—'Weekly Scotsman.'

NOTICES TO READERS AND CORRESPONDENTS.

All communications intended for insertion in this Journal must be authenticated by the name and address of the writer, not necessarily for publication, but as a guarantee of good faith.

Contributors are requested to be so obliging as to write legibly, and on one side of the paper only.

⁂ HUNTER ON THE TEETH, and the continuation of MR HULME'S Lectures on THE DISEASES OF THE DENTAL PERIOSTEUM are unavoidably postponed to next month.

BOOKS RECEIVED IN EXCHANGE.

The Pharmaceutical Journal for September.
The Technologist for September.
The Dental Cosmos for September.
The Madras Quarterly Journal of Medical Science, No. 2.

THE

DENTAL REVIEW.

NOVEMBER, 1861.

THE NATURAL HISTORY OF THE HUMAN TEETH.

By JOHN HUNTER, F.R.S.

EDITED BY

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(Continued from page 391.)

OF THE CUSPIDATUS.

The *Cuspidatus* is the next after the *Incisores* in each Jaw; so that there are four of them in all. (*g*) They are in general

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(*g*) [The term canine has been already limited to that tooth in the superior maxillary bone, which is situated at or near to the suture between it and the premaxillary, and in the lower jaw to that tooth which, in opposing the upper canine, passes in front of it when the mouth is closed. Neither the insectivorous or phyllophagous *Bruta* possess true canines. The two-toed sloth (*Cholœpus didactylus*), however, differs from the other genera of the order, in having the first tooth in both jaws of larger size than the succeeding ones; and, from the peculiarity of their shape, these larger teeth have received the name of canine. An interval, which is wider in the upper jaw, separates the so-called canine from the succeeding tooth; but, in consequence of the greater interspace above, the upper tooth plays upon the anterior surface of the lower, thus the relative position which characterises the true canines in Carnivora and Quadrumana is reversed. These teeth are three-sided, with the margins of the abraded surfaces leading to the point trenchant.

The presence and devolopment of canines in the Marsupial order, evidently present a close connection with the food and habits of its different genera. Thus, in the predaceous Thylacinus and Dasyurus, these teeth resemble closely in shape and proportions, the same weapons in the typical Carnivores. In the Dog-headed opossum (*Thylacinus*) the canines are long, strong, curved, and pointed: the apices of the lower canines are received in depressions in the pre-maxillary palatal plate when the mouth is closed, and do not, as in the placental carnivores, project beyond the margin of the upper jaw. In *Dasyurus*, the canines are of equal, or even greater development than in the Thylacine.

thicker than the *Incisores*, and considerably the longest of all the Teeth.

In an extinct animal of this genus, they resembled in form and proportions the same teeth in the Leopard. The canines present a diminished relative size in the Phascogale and other smaller species of the carnivorous group. The Opossums (*Didelphys*), present a dentition adapted to the mixed nature of their diet. Canines of considerable development are present in both jaws; but the molars indicate a departure from the conformation characteristic of the true flesh-feeders. The smaller species of Opossums are insectivorous; whilst the larger prey on small quadrupeds and birds, as well as on reptiles and insects, and even fruits. One species prowls along the sea-shore in search of crabs and other crustacea; another, Otter-like, subsists almosts exclusively on fresh-water fish. Canines are feebly represented in the Phalangers and Petaurists, which feed principally on fruits, buds, and leaves, together with insects, eggs, &c. In the herbivorous Potoroos and in the Koala, they are absent in the lower jaw; whilst they are wanting in both jaws in the Kangaroos and Wombat.

The large tailless Hedgehogs, or Tenrecs of Madagascar, have the most formidably-developed canines to be found in the whole Insectivorous order. In the Tenrec, these teeth present all the characters of the canines of Carnivora: they are large and long, pointed, trenchant, recurved, and single-fanged. A wide space separates them in both jaws from the premolars. In the European Hedgehog, no canine teeth are present. The first tooth which succeeds the incisors in the *Gymunra*, in both jaws, resembles in form and size a canine; but in the upper jaw it is implanted by two roots. In the Tupaias (*Glisorex*), small canines are present in both jaws. None of the small premolars which succeed the incisors in the Shrews fulfil the office, or have the configuration of a canine. The common Mole (*Talpa Europæa*), has an upper canine of large size, with a crown of characteristic shape; but it is implanted by two fangs. The tooth in the lower jaw, which by right of position is to be considered the canine, is small, simple, and resembles the incisors; whilst the first premolar has a laniariform crown, and like the canine above, has a double implantation. This latter tooth is considered the canine by Bell and Dr Blainville. In *Talpa myoura* the inferior canine is absent. In the *Condylure*, or Rayed-Mole, it is present, and has the form and proportions of a canine. Canines are absent in the lower jaw in the genus *Scalops*. Neither by virtue of shape or office are the teeth which succeed the incisors in the Chrysochlore to be considered canines.

Canines of normal form are present in both jaws in the Bats. In the Vampire (*Desmodus Vampirus*), the canines have large, lancet-shaped crowns similar to those of the incisors.

The absence of canines is one of the characteristics of Rodent dentition.

Order *Quadrumana*. In the Aye-aye (*Cheiromys*), whose dentition makes a near approach to that of the Rodents, canines are absent. They are present in the Slow Lemurs (*Stenops*), and in the True Lemurs, or Makis. In the True Lemurs, the inferior canines are compressed, and procumbent like the incisors. The upper canine tooth is long, curved, compressed, sharp-edged, and pointed. Canines are present in both jaws in the Platyrhine, as in the Catarhine *Quadrumana*. They are

The shape of the body of the *Cuspidatus* may be very well

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formidable weapons in the Capuchin Monkeys (*Cebus*). In the Monkeys and Apes of the Old World they are always longer than the adjoining teeth ; they are pointed, conical, with trenchant posterior margins. In the males of the great Baboons, Orangs, and Chimpanzees, they acquire a size and development rivalling that in the typical Carnivora. Their most formidable development is exemplified in the Mandrill (*Cynocephalus maimion*). In the Mandrill, the upper canines descend behind the crowns of the lower incisors, and along the outside of the first lower premolars, the crowns of which appear bent back by their action. Deeply grooved in front, like the poison fangs of some snakes, they have obtained the name of "*dentes canaliculati*," whilst their posterior margin is very sharp. They are separated by a long interval from the upper incisors, by a shorter one from the first upper premolar. A comparison of the human canines with the same teeth in the Gorilla, Chimpanzee, and Orangs, demonstrates one of the most striking structural differences between Man and those forms of life which anatomically approach him nearest.

In its conical shape, the human cuspidatus does not present an exception to the configuration of canine teeth generally ; but its peculiar characteristics are its small, absolute, and relative size, and the absence of any difference in its development in the two sexes. It is more deeply implanted, and possesses a stronger fang than the incisors ; its external surface is convex, its internal is flat, or sub-concave, and presents a slight prominence at its base. In the genus *Troglodytes*, the canine tooth in both sexes is of greater relative size than in the human subject, but in the male sex it attains vastly superior dimensions. In the adult male of both *Tr. Gorilla* and *Tr. Niger*, the apex of the upper cuspidatus extends a little below the alveolar border of the lower jaw when the mouth is shut : in the female the apex is lodged in the interval between the lower canine and first premolar. The crown of the upper laniary in the male is pointed, and of a conical figure ; its external surface is convex, presenting a longitudinal depression anteriorly ; posteriorly, it is somewhat flatter, and is bounded by a sharp cutting edge ; the internal surface is divided into an anterior and posterior facet by a longitudinal rising ; the posterior is concave, and both it and the anterior are grooved longitudinally. In the male Gorilla the cuspidatus has a more outward direction than in the Chimpanzee ; the anterior internal groove is deeper, and the internal ridge is more developed ; the posterior internal groove is continued lower on the fang, and the posterior trenchant edge is more produced towards the base. The size of the canine in the male Gorilla is greater, as compared with the incisors, than in the Chimpanzee ; in the male of both species, it attains twice the size of the same tooth in the female. In length the enamelled crown of the superior canine in the adult male *Tr. Gorilla*, measures one inch and four lines. An equal sexual distinction is maintained in the dimensions of the canines in the lower jaw. The crown of the lower canine is conical and trihedral, its external surface is convex, and the two internal are flat or slightly concave, and converge to an almost trenchant edge. Anteriorly, a ridge separates the external from the antero-internal surface. The entire length of the lower canine in the male Gorilla, is two inches and a half ; in the Chimpanzee, two inches. The crown in the larger species is one inch and a quarter in conceived, by supposing an *Incisor*, with its corners rubbed off,

length, and nearly an inch in breadth at its base; in *Tr. Niger*, it is three-quarters of an inch in length, and two-thirds of an inch across the base. In the Orangs (*Pithecus*), a like high degree of development is attained by the canines, which present the same sexual difference, and the same general configuration. The laniary of the Great Orang does not, however, quite equal that of the Gorilla, either in length or breadth. The posterior trenchant margin of the upper tooth is moderately developed, but the anterior longitudinal groove, which is present in both species of *Troglodytes*, is absent.

In the typical genus of the *Carnivora*—the genus *Felis*—the canines are remarkable for their size and development. In the Lion, for instance, this tooth is of extraordinary strength, deeply implanted by a fang of considerably greater length and thickness than the enamelled crown. The crown is conical and sharp-pointed, slightly recurved, convex in front, with one or two grooves on the outer side, almost flat on the inner side, with a trenchant posterior edge. The canines are proportionately somewhat smaller in the Hyænas than in the *Felidæ*. In the *Viverridæ* they are less developed, and their crowns are almost smooth. In the genus *Canis*, the enamel-pointed crown forms about half the length of the tooth, it is curved, sub-compressed, and the surface is uninterrupted by longitudinal depressions. Canines are well developed in the sub-family of the Badgers (*Melidæ*): they are well-pointed, with a trenchant, posterior edge. In the Indian Badger, the crown is more compressed than in the European. All the Seals (*Phocidæ*) are provided with large and strong canines. In the great proboscidian and hooded Seals, this tooth attains very formidable development, especially in the male; its fang is curved, thick, and subquadrate. Canines are only present in the upper jaw of the Walrus, but their absence in the lower is fully compensated by the extraordinary size and development attained by the superior pair. These teeth grow to an enormous length; they descend and project from the mouth like tusks, inclining slightly outwards, and bending backwards. A transverse section of the tooth presents an oval, with a shallow, longitudinal groove on the inner side, and one or two narrower, longitudinal impressions on the outer. Its growth being uninterrupted, the base continues widely open. The tusks of the Walrus are not merely weapons of offence and defence, but they are most serviceable in aiding the animal to clamber over blocks of ice. In a large extinct Carnivore, the *Machairodus*, the upper canines attained a development almost rivalling that of the tusks of the Walrus. Their shape, however, as well as the number and conformation of the other teeth, indicate a close relationship to the genus *Felis*. The crown of the Canine in *Machairodus* is more compressed and trenchant than in the *Felidæ*. It passed outside the lower jaw when the mouth was closed, as is indicated by a depression on the outer side of the inferior maxilla, between the canine and first molar. Both the anterior and posterior edges of this long, falciform tooth are finely serrated. The lower canine of *Machairodus* is small, and appears to form the terminal tooth of the incisor series.

Herbivora.—Amongst the vegetable feeders, the presence of canine teeth in one or both jaws is by no means constant. Thus, in the hollow-horned Ruminants, these teeth are invariably absent in the upper jaw. In many, also, of the solid-horned Ruminants (*Cervidæ*) upper canines are equally wanting. In those which possess them, they are frequently so as to end in a narrow point, instead of a thin edge; and

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confined to the male sex, and when present in both sexes, they are always of minor development in the female. Amongst the deer tribe, upper canines reach their largest size in the small musk-deer, especially in the typical species (*Moschus moschiferus*), in the males of which the proportions attained by these teeth are intermediate between those in the *Machairodus* and in the Walrus. It is interesting to notice that, although these teeth are not present in the upper jaw in the more typical *Ruminantia*, that yet they existed in those extinct forms which appear to have been replaced by them. Thus, amongst the fossil remains of the eocene tertiary period, we find canines present in both jaws in the *Dichodon cuspidatus*, an animal which, as respects its dentition, appears to have formed a connecting link between another eocene tertiary form —the *Anoplotherium* and existing *Ruminantia*. In the *Dichodon*, these teeth closely resemble the incisors. Although a little larger, and having a low point, they are yet more trenchant than piercing. The presence and development of upper canines in the Ruminants appear to bear an inverse relationship to the presence and growth of horns. Those ruminating animals which have typical horns are unprovided with these teeth. First present in the periodically hornless deer, they attain their largest dimensions in the absolutely hornless Musks; whilst, in the Camelidœ, the upper canine is not only of formidable dimensions itself, but, as we have already seen, it is accompanied by an upper laniariform incisor. In the Llamas of the New World, the upper canines are more feeble than in the camels and dromedaries. The inferior canines in the ordinary Ruminants are procumbent, and appear to form part of the same series with the lower incisors. They may, however, be distinguished by the lateness of their eruption, and frequently by their form. Thus, in the Musk-deer, they are smaller and more pointed than the incisors; in the Giraffe they have a much larger crown, which is bilobed. In the Camelidœ, they are more erect in position, and present a laniariform configuration. In the *Aucheniœ*, a short diastema separates them from the incisors.

On turning to the non-ruminant, even-toed Ungulates, we find, in the Hog tribe, a remarkable development of the upper canine teeth. The tusks or upper canines of the Wild Boar curve forwards, upwards, and outwards; their sockets having a similar direction, and being strengthened above by a ridge of bone, which is remarkably developed in the African Masked Boar. The enamel on the inferior side of the tusk is ribbed longitudinally; a narrow strip of hard enamel is also laid upon the anterior part, and another upon the posterior concave angle forming the point of the tusk, which is worn obliquely upwards from before, and backwards from that point. In the female, the tusks are of much smaller dimensions than in the male. Their development in the latter is arrested by castration. A similar tendency to excessive development of the canine teeth is to be observed in the Hippopotamus. In this animal the lower canines are extremely massive and large; the crown is curved and subtrihedral, the angle dividing the two anterior sides, which are convex and enamelled, being rounded off; the posterior side is almost entirely occupied by the oblique surface abraded by the upper canine. The upper canines are trihedral, with a wide and deep longitudinal groove behind; they curve downwards and outwards; the exposed part of the crown, which is worn at the forepart from above obliquely downwards and the fang differs from that of an *Incisor*, only in being much larger. (*h*)

The outside of the body of a *Cuspidatus* projects most at the side next the *Incisores*, being there more angular than any where else.

The Enamel covers more of the lateral parts of these Teeth than of the *Incisores*; they stand perpendicularly, or nearly so, projecting farther out in the circle than the others, so that the two *Cuspidati* and the four *Incisores* often stand almost in a straight line, especially in the Lower-Jaw.

This takes place only in adults, and in them only when the second Teeth are rather too large for the arch of the Jaw; for we never find this when the Teeth are at any distance from one another, or in young subjects. Their points commonly project beyond the horizontal line formed by the row of Teeth, and their fangs run deeper into the Jaws, and are oftener a little bent.

In the Upper-Jaw they are rather longer, and do not project

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backwards, is very short. As in the incisors, the base of the canine is simple, and excavated for a large, persistent matrix, which insures the perennial growth of the tooth.

Amongst Perisso-dactyle Ungulates, we find canines present in the genera *Equus* and *Tapirus*, absent in the Rhinoceroses and in the Hyrax. In the Horse, these teeth are small in the stallion, less in the gelding, and rudimental in the mare. The upper canines are placed in the middle of the long interspace which separates the incisors from the premolars. The crown, when unworn, is characterised by the folding in of the anterior and posterior margins of the enamel, which includes an extremely thin layer of dentine. The lower canine, as in *Ruminantia*, is close to the incisors, but is of a more pointed shape. In the Tapir, the canines are of cuspidate form, the crown is much shorter than the root, and does not project beyond the lips. The outer surface of the crown is convex, and is divided by sharp margins from a less convex inner surface. The upper canine is separated from the incisors by a short interval, which receives the crown of the lower. The lower forms part of the same semi-circular series with the inferior incisors. In the Proboscidians there are no canines. (1)]

(*h*) [In the different varieties of the human species, the canines present no constant variation. It has been asserted that they are more acuminated in the Melanian races. An examination of a large number of Negro and Negrito crania, however, has led the Editor to the conclusion that there is no constant difference in the configuration of the cuspidati in those races. Their prominence, like that of the incisors, is generally in proportion to the greater or less degree of prognathic conformation.]

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(1) Owen, *op. cit.*

much beyond the circle of the adjacent Teeth; and in this Jaw they are not placed vertically, their bodies being turned a little forwards and outwards.

When the Jaws are closed, the *Cuspidatus* of the Upper-Jaw falls between, and projects a little over the *Cuspidatus* and first *Bicuspis* of the Lower-Jaw. When they are a little worn down by use, they commonly first take an edge somewhat like a worn *Incisor*, and afterwards become rounder.

The use of the *Cuspidati* would seem to be, to lay hold of substances, perhaps even living animals; they are not formed for dividing as the *Incisores* are; nor are they fit for grinding. We may trace in these teeth a similarity in shape, situation, and use, from the most imperfectly carnivorous animal, which we believe to be the human species, to the most perfectly carnivorous, viz. the lion. (*i*)

(*i*) [That our conclusions as to the functions of an organ as it exists in man, when drawn exclusively from analogous structures in the lower animals, will frequently prove erroneous, is strikingly shown in these observations on the use of the cuspidatus. The simple and obvious use of this tooth, in the human species, is to tear such portions of food as are too hard or tough to be divided by the incisors; and we frequently find it even far more developed in animals which are known to be exclusively frugivorous. Not only is its structure wholly unadapted for such an object as that assigned to it in the text, but there is no analogous or other ground for supposing that man was originally constructed for the pursuit and capture of living prey. His naturally erect position, and the structure of the mouth, would render this impossible by the means inferred by Hunter, and the possession of so perfect an instrument as the hand, obviates the necessity of his ever employing any other organ for the purpose of seizing or holding food of whatever description.—T. Bell.]

(To be continued.)

ORIGINAL COMMUNICATIONS.

ON A CASE IN WHICH THE FULLY-DEVELOPED CROWN OF A MILK-TOOTH RECEDED INTO THE JAW.

Observed by Hr HUMM, PRACTICAL DENTIST AT ALTONA IN HOLSTEIN.

Translated from the 'Deutsche Vierteljahrsschrift für Zahnheilkunde'
(German Quarterly Journal of Dental Science) for July, 1861,
By GEORGE HENRY, M.C.D.E.

THE subject of this case is a little girl, now two and a half years of age. The first dentition was completed with her second year, all the teeth having appeared at the proper time and in regular order.

At the age of fifteen months, the crown of the right central incisor began to recede; and at the present time it is covered with the gum, leaving only a small portion of the incisive edge exposed. There is no indication of any swelling; the gum is not inflamed or sore to the touch, nor does the child complain of any pain in the tooth, even when pressure is applied to the small portion of the crown exposed, which is neither loose nor discoloured.

The child, who is pale and sickly in appearance, has been subject to most of the complaints peculiar to childhood, and has suffered particularly from a bad attack of small-pox: she is endowed with an intellect suitable to her age; is lively, and enjoys a good appetite and digestion.

After giving the above description, Hr Humm says, "I must acknowledge that the cause of the receding of the crown of the tooth is not satisfactorily clear to me. If a cessation in the development of the tooth be the cause, then it is very remarkable that none of the other teeth are similarly affected; nor does this hypothesis throw any light upon the receding of the crown.

"The removal of the root of the tooth by absorption is a more reasonable supposition; yet this is questionable, and the following observations must not be overlooked. Suppose absorption to have taken place, would not the crown become loose and drop out, as by the shedding of the teeth? But in this case it is firmly seated in the jaw, and continues to recede and disappear. Further, would not the crown of the tooth be changed in colour, through absorption, which at this tender age would only be ascribed to a pathological process? But this is not the case, for the exposed portion of the tooth is the same in colour as the crowns of the remaining teeth; and would not such an occurrence have explained itself, through some appearance or other, such as the presence of small ulcers or slight irritation? That inflammation had been present, does not appear to me to be admissible; and it is unlikely—even incredible—that in the absence of any pain whatever, inflammation could have been so powerful as to open a passage upwards for the root of the tooth, whereby, however, the receding, the firmness, and the good colour of the tooth would have been easily accounted for; but I cannot admit the correctness of such a conclusion, for the external and internal portions of the jaw and the nose are in a perfectly normal condition, and there has always been an entire freedom from pain.

"The following has suggested itself to me as being the most probable cause—that of 'mechanical influence,' as from a blow or a fall, producing a slight inflammation at the root of the tooth, imperceptible to the child, yet sufficient to induce absorption.

"Through pressure in eating, or biting the finger or any hard substances, the tooth is gradually pressed back into the jaw, in proportion with the progress of the absorption, until at last the mechanical pressure in biting being exerted solely on the gum which has closed over the tooth, the receding process ceases. In this case it is probable that the absorption is checked, and in due time, when the deciduous shall be replaced by the permanent set, the remaining portion of the crown will be shed to make room for its successor."

In conclusion, Hr Humm hopes that, in advancing this explanation, he may not be misunderstood, for he does not say that his view of the case must be a correct one; he also requests that any gentleman who can give a clearer elucidation of it will kindly do so, as the case is certainly one of great interest.

Hr Humm finally mentions a similar case communicated to him by Dr Kranner, of Hamburgh, which occurred in the permanent incisor of a girl ten years of age: that gentleman, however, was unable to watch the case, owing to the girl's change of residence.

THE DENTAL REVIEW.

LONDON, NOVEMBER, 1861.

The opening of the Medical and Dental Schools affords us an opportunity, occurring but once a year, of noticing the progress of our youth and the advance of our science in its educational aspects. We have pleasure, sincere pleasure, in stating, as a preliminary fact, that in our own department there is no falling off, but, on the contrary, an increased desire on the part of those who are entering the Profession to which we belong, to take advantage of the great and happy privileges for obtaining scientific knowledge which have been opened to them by the foundation and establishment of the Metropolitan School of Dental Science.

In the Medical Profession, we believe, the entries of students are much beneath the average, the new regulations in regard to preliminary qualification having acted as an effective barrier to the entrance of many students upon studies to which their interests or their ambition, or both these faculties combined, had otherwise led them. How far these barriers will ultimately influence the position and prospects of the body Medical, it is not for us to judge: suffice it to say, that on this moot point the opinions of Medical men are freely divided, and while one section considers that a great gain will be achieved, that Medicine will be made more exclusive, and a higher class of men will be born to represent her; others contend, that by placing unnecessary fetters on knowledge, genius will be suppressed, and many men who by self-culture and self-aid would rise to adorn the art, will turn their talents into other channels and become the foremost in other sciences and other walks of life.

It is clear, *à priori,* that the advocates of this latter view, have all the lessons of history on their side. It is certain that in Medicine, in Chemistry, in Geology, in Astronomy—nay, even in pure mathematics—the men who have up to this time represented these sciences most nobly, most sublimely, have been such as have risen by individual effort and individual enterprise John Hunter in Anatomy and Surgery, Dalton in Chemistry, Hugh Miller in Geology, and Isaac Newton in Astronomy, who more generally represent the sciences to which they have rendered their illustrious efforts, and who of the simple, have risen more distinctly under the influences of pure freedom and elementary social life! We offer these observations not as denying the wisdom of the new and stringent regulations in Physic, but as indicating that the Directors of our own excellent School have made no error and courted no absolute omission, in that they have let matters stand as they have as yet stood; in that they have put no new obstacles to the entry of students to our particular Profession, but offering a fair field, and no favour, have said, virtually, to every thoughtful youth, here are the privileges we have to bestow, freely and openly supplied, come and accept them, or keep away.

The Session has been inaugurated, as usual, with customary routine and ceremony. The introductories were more than ordinarily eloquent, and for once the eloquence was combined with much common sense. Thus, in addressing his assembled auditors in the walls of old St Thomas, Dr Bernays with great care impressed on the students the immense importance of learning to write good sound English: the more, he thought, men of the Professions mix with men of letters, the nearer they approach to the excellencies of literary art and composition, the more will they be respected by the public, and the greater will be their advancement. In similar strain, Dr Richardson, in addressing the students of the Metropolitan School of Dental Science, urged on them the necessity of acquiring a perfect knowledge of composition and style. Learn to write, he said, learn to write a legible hand, for that is not to be despised, but learn also to express your thoughts and observations so plainly, that he who runs may read, and that no critic shall be able to say, from your style, this writer is necessarily an illiterate man, a man who may perchance possess a certain amount of special knowledge, but, who in the matter of accomplishments, is deficient altogether; who wants that which no wealth can purchase, and no external appearance supplement or replace.

But in his introductory lecture to our younger brethren, the Lecturer went further into the question of extra professional learning. He urged them to become students in the general sciences; he showed what other men of special grades have done—how a shoemaker, by turning his attention to chemistry, discovered, or rather propounded, the atomic theory; how an optician discovered the lines of the solar spectum, and led the way to the analysis of the central luminary: he pointed out that the day was advancing when, by these tests, the men of every profession would be estimated, and when anyone presuming to be a professional man, failing before the world in general knowledge, would be avoided as a pretender and deceiver, perhaps too late in life for the successful removal of the obstacle in his way; that education is the password to honour, and that theywho actually rule the world and sway the public mind, are they who not only think best, but who, whether in writing or in speaking, express themselves with most perspicuity, and with the largest share of scholarly power.

We commend a second time these principles to the students who have this year entered our Profession through that school in which they were enunciated. We would recommend such precepts truly to all students, but especially to the particular students to whom reference is now made; and this because they hold a peculiar and important position at the present time. At this moment, our Profession is divided into three companies in respect to political feeling and character. About 120 Dentists, acting under various influences, have taken the Dental Certificate of the College of Surgeons, hoping thereby to affiliate themselves to a stock which will have nothing to do with them except take their money. There is a second body which claims independence, which says that Dentists are numerous enough, respectable enough, and able enough to make and sustain their own institution: and there is a third division, constituting nearly four times as many in numbers as the two former sections combined, which seeks no organisation, which says tacitly, " as things were, so let them be; a fig for reform, and a pin for professional unity; let us go on unmolested, fighting an individual battle, and reaping an individual advantage or an individual failure."

This is our present state; and if the existing generation of Dentists were likely to live and draw teeth, and stop teeth, until they each and everyone arrived at the age of Methuselah, we might expect at least a thousand years to slip away before any great change should modify the surface of the scene. But, unfortunately, or perhaps for all parties fortunately, the generation must go, must make room for younger men who will bear with them the ideas of their time, and in one way or other develop the present phase of affairs into a more fixed and determinate shape. And, so we say again, that the remarks which have been addressed to those of our students who, in the commencement of their careers, have chosen the independent side, are of immense import. If these learners take up the solution of the question now in the balance, it is settled for good; if they become students in spirit, as well as in the letter, if they bring themselves to be the teachers of a succeeding race, if they nourish the idea of an independent brotherhood, if they aim towards the highest excellence in science, then the end which their predecessors have hoped for and fought for, with much less advantage and much less power, but with unvarying credit, will be as sure as the returning day.

And this leads us to say a final word respecting the prizes and life honours to which our junior brethren should direct their efforts. It should be their first duty, obviously to prepare themselves for their Professional labours, and to join in brotherly work with those who are aiding in sustaining the organisation of the Dental Profession, and in advancing its social and material advancement. But we would remind them, that there are distinctions open to them in science; and one distinction especially, the possession of which would confer on themselves the greatest benefit, and reflect on the whole order the greatest honour. We are not referring to the certificate of the College of Surgeons: that hybrid, semi-political, pseudo-scientific, questionable document can confer neither right nor credit: but the distinction to which we do refer is the Degree of Bachelor, or Doctor of Science of the University of London. The examination for admission to this great scientific rank and nobility is now open to every worthy competitor: no restrictions are demanded, no certified evidence of preliminary education asked. Whoever dares may try in the race for the Doctor of Science; and we hope that ere long we shall find our Students not only anxious to compete for this honour, but urgent on their teachers to make such additions to the School as shall put every subject required for examination at their command. It is but to begin; it is but for a few earnest young men entering our ranks to prepare themselves, in the course of their studies, for graduation in science, and the ground, once broken, the science doctorate would speedily become the outward and visible sign of the first class Dentist in England.

WE are glad to be able to state that the NATIONAL DENTAL HOSPITAL is progressing so rapidly towards its completion, that it will be formally opened in a few weeks. The Institution, situated in a populous part of London, Great Portland street, is so placed as to secure a full attendance of patients, and to form, consequently, an excellent practical school. A sufficient sum of money has already been raised for preparing and opening the building; while a handsome annual subscription list provides for the future continuance and support of the charity. In our next impression, we hope to announce the terms on which Students will be admitted to the practice. Meanwhile, to those who are waiting for the advantages of the practical instruction, we may state, confidently, that the fees will be regulated with special reference to the means of the Student; that no sectarian prejudices will be allowed to interfere with the educational department; that there will be no effort left undone to render the teaching as demonstrative and as perfect as can be desired. We hope, moreover, to make our own pages still more acceptable to our subscribers, by supplying regularly in them, a history of the more interesting cases treated in the hospital, and of the improvements in Dental Surgery, which may there be tested or applied.

SELECTED ARTICLES.

DENTITION AND ITS DERANGEMENTS.

A COURSE OF LECTURES DELIVERED AT THE NEW YORK MEDICAL COLLEGE AND CHARITY HOSPITAL (SESSION 1860-61.)

BY A. JACOBI, M.D., Prof. of Infantile Pathology and Therapeutics.

(From the 'American Medical Times.')

(Continued from page 454.)

LECTURE V.

THE belief that the formation and protrusion of teeth are morbid processes, or give rise by their own nature to a large number of diseases, is by no means so old as we are apt to suppose from the general prevailing opinion. Old Hippocrates has a few remarks on the subject, but he cannot, from the few words that are found in his works, be presumed to have cherished the opinions of more modern doctors. For his remarks are, that "in those children who have proceeded to the age in which they get teeth (πϱος δε το οδουτοφυεω προς αγουσω), there will occur a disagreeable itching in the gums, fever, convulsions, and diarrhœa, particularly at the time in which the canine teeth will protrude, and in such children as are very fat and suffer from costiveness." And he further states as his experience, that "such as have diarrhœa during dentition, will suffer less from convulsions than such as are costive. Such who suffer severely from fever, will be less affected with convulsions than those who keep their flesh and weight, and feel inclined to sleep. Such as get their teeth in the course of the winter, are better off, under equal circumstances. Not all those who have convulsions during dentition will die, but a number will be saved. Those who have a cough during dentition, require a long time before they are through, and will emaciate more considerably. Those whose teeth will protrude in the winter, suffer less than others." Nor has Celsus any remarks showing that he considered the process of dentition a disease or a cause of diseases; Galen only, in his commentations on the aphorisms of Hippocrates, thinks proper to state that diseases may be the result of the irritation produced in the gums by the protruded teeth. This theory has prevailed in the middle ages, both among the Profession and the public of all countries, not from its being proved, but only because it was not examined; or rather because medical science and natural philosophy made no progress, or very little indeed, for more than fifteen centuries after the death of Galen and Aristotle. There is, however, a remark in the work of Mercurialis on the diseases of children (1584), which shows that the minds of eminent men will not always be clouded by prejudices, though old and general. He states that he cannot help having some doubts, although he feels some hesitation in pronouncing them, as to how dentition could be a disease; as it certainly is as clear to comprehend that nature does not intend nor willingly create disease; and dentition is a "mere work of nature, that is to say, a physiological process, and for this reason, must not be called a disease." And Heister, in 1753, has the following: "When symptoms like pain, crying, sleeplessness, fever, convulsions, and epilepsy, occur, it is sometimes really difficult to learn where they come from, and from what cause, as they will depend on a variety of causes. Therefore, all such symptoms must be weighed in your mind with the utmost sagacity, until you are able to say, for certain, or with every degree of probability, whether they arise from bad milk or from other causes."

There are some names in literature, which ought to have the full credit for their endeavours to enlighten the Profession on the nature of dentition and its pathological importance or unimportance. I would here mention the names of Wichmann, Sternberg, and Buchheim, and also Brefeld. But in order to understand, against which and how many prejudices they had to battle, it will be necessary to state some of the opinions spread amongst the Profession, in whose minds there was no doubt that the irritation produced by the protrusion of teeth gave rise to diseases. The Profession only differed as to the explanation of the locality, nature, and mode of acting of this irritation, and you will find some amusement in comparing different opinions.

One would assume that there were a large number of nerves in the gums, and an extraordinary irritability resulting therefrom. Another, and an illustrious man, too, would take it for granted, that a layer of osseous matter, covered moreover with periosteum, would prevent the tooth from protruding from its cavity. The osseous layer was, besides, asserted not to adjoin tightly the circumference of the protruding tooth, which would permit air to enter and irritate the poor dental nerve. In the opinion of others, the general irritation in dentition would be the result of the pressure of a tooth and alveolus on each other, which is less comprehensive to common sense than any other explanation. Others again presume that the gums, while retaining the tooth in or repelling it into the alveolar cavity, would exert a pressure on the nerve. One says, incisors give rise to a large number of casualties because they are so sharp and pointed; another, that the protrusion of incisors causes but a small number of casualties because they are so sharp and pointed. A third again says, diseases during the protrusion of the incisors are very frequent, because some of these and the first molars cut at the same period in which the system is still very feeble and the gum very irritable; a fourth, that they are rarer than at the time of the protrusion of the molars and canines, because the gums are softer, and all the fibres more tender. One declares that the protrusion of the incisors is not so dangerous, because their point is sharp; the other, that the canine teeth are very troublesome; because again, their point is sharp; and a third, because it is not quite sharp. The same canine teeth prove very dangerous, in the opinion of one, because they grow very slowly; of another, because they protrude so fast, faster than the molar teeth, which cut with a broader surface, but more slowly and gradually. At last another comes telling you, that molar teeth are very dangerous, because of this very broad surface penetrating the gum. But more dangerous than any of the molars or incisors are the canine in the opinion of another busy expounder, because in its protrusion it is hemmed in by an incisor on one, and a molar tooth on the other, side. There comes, then, a profound anatomist, who discovers that there are folds along the upper margin of the gum which, when normally developed, will prevent any disorders and serious diseases; but the norm appears to be that their development is thoroughly abnormous—and that diseases during, and in consequence of dentition, are commonly found. A neuropathologist considers a cutaneous spasm to be the common cause of all the troubles; another denies the sensibility of the gums, but thinks proper to attribute to it a large amount of irritability. A follower of humeral pathology seeks for the cause of all the evils in the increased quantity and poisonous condition of the saliva; another, in the suppression of the secretion of the salivary glands; a third, and one of the best names, too, Hufeland, in the fever which is said to be absolutely required for the regular and normal progress of dentition. And at last a celebrated author also goes so far as to deny the existence of local influences in the gums to produce general diseases, but attributes them to the fact that, during the protracted period in which teeth protrude, the general development of a large number of organs takes place contemporaneously, and that dentition disturbs its regular progress.

These and other opinions have been expressed, and warmly defended, as the origin of all those numerous, or rather numberless, diseases of dentition. Buchheim, in an elaborate article published forty years ago, has, by ransacking the literature of the last and the first twenty years of this century, collected these and more theories of a similar kind, and exhibited an unusually interesting picture of contradictions and arbitrary assertions. I have abstained from giving the names of the authors of such theories as have been brought before you; but I have thought it just as well done to omit them, not considering these theories to entitle their inventors to immortality. Such as have no other claim to immortal fame, will soon be forgotten, and some of them have been forgotten already, with the single exception of their names.

I was just about closing up the exhibition of these more or less queer, comic, or astonishing opinions concerning the cause of the numerous supposed diseases of dentition, when I remembered the great physiologist, pathologist and public benefactor, M. Delabarre, of Paris. He has at last dissolved the gordian knot of that much tormented question all at once. What of inflammation of the pulp? he exclaims, what of compression of the periosteum, injured nerves, tension and rupture of the gums, and all other assumed causes of the diseases of dentition? Why is it, he asks triumphantly, that one-sixth of all the deaths in infantile age occur from dentition? I have found it! Do you not see that before and during the protrusion of teeth the child brings its fingers to the gums? Would a child do so when or because it has pain in the gums? Certainly not; for if it had pain it would carefully avoid touching and pressure. Therefore, "que serait-ce, sinon une sensation de prurit, de denangeaison, de chatouillement?" What could it be, pain being out of the question, that induces the child to bring its fingers to its mouth? Why, a sensation of pruritus, or tickling. Now, this pruritus of dentition will not be found, or not considerably, in normal cases of dentition; but in children with bad nutrition it is perfectly intolerable, and gives rise to the perturbation of all vital functions, sleeplessness, loss of appetite, dyspepsia, fever, diarrhœa, vomiting, and convulsions. Nor does the author of this ingenious theory pretend to say that all the children are equally subject to this dentition pruritus. Not at all. Those suffer most who are most ticklish.

If, perhaps, you cannot understand the logic of these assertions, their author will probably consider you incompetent. He may be right, as long as you do not know all the attending circumstances. The reason why this theory was invented is this, that M. Delabarre invented at the same time his dentition syrup, which is determined to cure the dentition pruritus, and thus to save a million of infants a year. It is but just to say that M. Delabarre knows more of this syrup than anybody else, as he has taken particular pains not to divulge its composition, but to prepare and sell it himself. Thus, you have the wonderful sight of the powerful mind of a single ingenious man discovering two important things contemporaneously—viz., a morbid condition, or a disease, which is the cause of a legion of others, and besides, the infallible remedy. Which of the two he has discovered, or invented, first, "deponent saith not."

That a large number of infants cut their teeth without any bad symptoms, has never been denied. Instead, however, of considering these cases as natural, they have been taken as exceptions; instead of looking for the causes of diseases in the age of the patient, and its various morbid dispositions in its constitution or in direct injuries, both authors and the public have seemed to rest satisfied in the belief that the more an infant was disturbed with abnormal functions, the nearer came dentition to its natural standard. But all the symptoms observed during or before the protrusion of teeth do not come within the range of morbid affections. I have already spoken of some of the symptoms indicating the approximation of, or attending, the progress of dentition; I, therefore, shall not dwell upon them, but shall briefly enumerate such as are generally attributed to the protrusion of teeth. I may state that many explanations which would be here required, will naturally follow a physiological sketch of early infantile age, which I intend to give you in a future lecture.

The general irritability of the nervous system in teething children, is said to be increased. They are restless, sleepless, will suddenly awake from a short slumber, are peevish and cross, change their colour frequently, and often urinate. I am certainly unwilling to deny the frequent occurrence of these symptoms in teething infants, but will take the liberty of stating, that in early infancy nervous symptoms are of frequent occurrence; that even the weight of the organs of the nervous system is greater in proportion than at any other period of human life, and its action may be supposed to be more powerful, and perhaps irregular; and that the very same symptoms attributed to teething are really being observed in almost all the affections occurring at this age. Both functional disorders and diseases are the more frequent the younger the individual; this is a fact clearly shown by all the statistics of both private and hospital practice, relating to both diseases, and the rate of mortality in this early period of life.

The local irritability produced by the process of dentition has often been noticed, and alluded to as a proof that there is something very peculiar and troublesome about this process. The infant is said to put its fingers into its mouth, and introduce anything it can lay hold on; it bites the nipples, and gentle rubbing of the gums causes an agreeable sensation. It is said to rub its lips, nose, and eyes, and to move the occiput on the pillow, especially at the time of the protrusion of the incisors of the upper jaw.

Such are said to be the local symptoms of either approaching or present dentition; the latter term always being made use of to signify the final protrusion of the teeth. Is it remarkable that an infant will put its fingers into the mouth at this protracted period of teething—viz., from the fifth or sixth to the thirtieth month, when it has done so from birth? The very fact of the peculiar position of the fœtus in the uterus, the prominence of the action of the flexor over the extensor muscles, appear to be among the first causes of the new-born child's sucking its fingers. The great sensibility of the cutaneous nerves of the ends of the fingers, and of the lips, which are moreover regularly exercised by the reception of food; the indistinct impression, in the infant, after having been nursed a number of times, of the lips and mouth being in some connection with the feeling of satisfaction, are the reasons why the infant sucks its fingers in the few weeks and months following its birth. Whichever explanation is correct, it is a fact that, from the hour of birth the infant will either suck its fingers or keep them in the neighbourhood of the mouth and nose. Nor is it astonishing that an infant will, during the time of dentition, take everything to its lips and into its mouth, after it has done so all its life. The principle impressions an infant obtains depends on its relation to foods and drinks; eating is the only real propensity an infant has, and the mouth is known by experience to be the great receptacle destined for the reception of everything around; not to speak again of the lips being used as a means of touching, grasping, and learning the qualities of things. Everything living learns by experience and experiments, by physical impressions. All the sensory organs will be exercised for the purpose of understanding the impressions on the peripheric nerves, and the sensory organ first freely exercised by an infant is that of palpation. Further, a teething child will often bite the nipple, undoubtedly, but a number will not; and any child with any irritation of the cavity of the mouth, with any form of stomatitis, with any disease in fact which causes a sensation of uneasiness, will do the same. And, finally, ought we to attribute the restless movements of the occiput on the pillow to teething, when every child affected with almost any affection of the brain, or its membranes, with hyperæmia of the cranial bones, with cutaneous eruptions of the cranial integuments, and rachitical affection of the bones, will be observed to do the same? Why is it that the protrusion of the upper incisors is often attended with this restlessness, and almost regular moving to and fro of the head on the pillow? It means, that irregularity, or anomalies in the protrusion of the upper teeth frequently depend on the anomalous development of the upper jaw itself; and that the development of the upper jaw is generally in intimate connection with the development of the cranial bones. Thus you perceive, that when this is abnormal, and the upper jaw suffering accordingly in its general development, that often-mentioned symptom has nothing to do with the protrusion of teeth, as such, but must be referred to a defective or abnormal development of the cranial bones and subsequent anomalies in the structure or function of the brain. Instead, therefore, of pointing to dentition, especially to normal dentition, it indicates some more or less grave disturbance in the constitution or function of either the brain or its membranes, or its cranial or cutaneous integuments.

There are some objective symptoms announcing the approaching protrusion of teeth, which are of more or less importance. The gums will swell, and become looser and softer ; or, which is more common, the alveolar margin will become thick, hard, flat and prominent. This condition is always perceptible, and nevertheless we are liable to be mistaken as to its signification. I have seen a child, who had this prominence of the thickened alveolar margin over several teeth for a long time, without the teeth making their appearance. In fact, deep incisions had been made into the gum, more than two months before the first incisor cut through. This shows that although the normal process of dentition generally requires the condition of the alveolar margin described above, we are by no means justified in predicting a speedy protrusion of a tooth through the thickened and elevated wall.

This prominence of the so-called dental cartilage is often said to be red, livid, and soft. But in healthy infants, and with normal dentition, the contrary is generally the case. The mucous membrane of the mouth, although normal, is generally of a deeper colour than the normal appearance of the gums, and frequently, in catarrhal affections of the mucous membrane of the mouth, the difference between its livid and softened velvet-like appearance, and the pale colour and solid condition of the gums, is remarkable. Only when the protrusion of a tooth is very imminent, the gum will be in many cases a little sensitive, on being touched or pressed ; and saliva and mucous are said to be secreted in a large quantity at the same time, until the gums become thinner and thinner, and the tooth protrudes.

Great importance is attached to salivation by the public, as a premonitory symptom of dentition ; but it is a fact, that it will sometimes precede the breaking through of a tooth for a number of months, and will not cease after the tooth, or a group of teeth, have made their appearance. It is thought to be caused by the direct irritation of the gums acting on the mucous membrane of the mouth, and the stenonian ducts, and the salivary glands. It has even been considered to be the cause of a number of accidents occurring during dentition ; the saliva and mucous were, in the opinion of a number of medical writers, swallowed, and proved to be the cause of vomiting and diarrhœa, of erosions and apthous inflammation of the mucous membrane. The truth is, that increased salivation is regularly observed in infantile age, long before, and during the first period of dentition. If, therefore, those authors were right, who believe it to depend on the irritation of the mucous membrane of the mouth, and of the salivary glands, there must be a constant irritation of the gums in every normal dentition. This, however, is not so, according to my preceding remarks. I will simply state now, that the increased secretion of mucous and saliva before this time does not depend on the protruding teeth, but is the result of the salivary glands and mucous follicles undergoing about this time a rapid process of development. We shall have to return to this subject, and have to learn from a physiological sketch of the infantile organism, which I expect to give in this course of lectures, that a number of symptoms, apparently affected by each other, and depending on each other, are but inordinate consequences of one and the same common cause. At all events, this will be readily understood by you, that the increased salivation need not be produced by some supposed constant irritation of the gums. At all events, you will not be deceived by the occasional emphatic statement of the following observations, which is meant to show that dentition in normal and robust children will be attended with copious salivation, while sickly and feeble children have no salivation to any amount. This appears to be true, but is not. The observation is imperfect in this, that healthy and robust children of four, six, or eight months will generally, while awake, be in an upright position, thus dropping a large amount of the secreted mucous and saliva, and being constantly wet with it; while sickly and feeble children of the same age, will, first, be a little backward in their general development, and moreover, have too little muscular power to allow them any but a supine position. Thus they will swallow most of the secretion, which more robust children will be constantly wet with.

I think it but reasonable to infer that if remarkable symptoms are the result of dentition, either normal or abnormal, a large number of anomalies must take place in the immediate neighbourhood of the protruding tooth, if not in its own substance. Such affections are found, indeed, and known by the terms of *odontalgia*, *odontitis*, and *gingivitis;* but they are very rare affections, and the only idiopathic ones which are said to have occurred during, or rather in consequence of, dentition.

Odontalgia, or neuralgia of the dental pulp, the dental nerve, is said to have been observed in teething children. What were the symptoms of this disease of dentition? Patient cried much, kept his fingers in the mouth, caught the breast greedily, and left off just as suddenly; was also constipated, but otherwise healthy, and there was but little injection, and intumescence of the gums. Exactly the same symptoms are reported to attend normal dentition, with the exception, perhaps, of constipation. But the restlessness of the infant was in connection with this constipation, and it screamed from colic pains. Although we are told by observers that the symptoms would disappear with the protrusion of the very first point of a tooth, the number of cases of this dental disease is so small, that we cannot refrain from doubting the correctness of the diagnosis. In olden times, odontalgia from dentition has been observed a number of times; thus, Karl Himly has a chapter on the subject; but a more modern author, Hanmann, relates having seen two cases occurring during the protrusion of the molar teeth. Two cases in the lifetime of a medical man, who has met with many thousands of teething children; no pathognomonic symptoms in these very cases to distinguish them from other complaints; no like observations in the practice of hundreds of other practitioners—all this looks rather suspicious, and leads us to infer that this odontalgia depending on dentition, although its occasional occurrence during the protrusion of a tooth may have been observed, is rather doubtful.

Gingivitis, inflammation of the gums, is also reported to have been observed in the course of dentition. Its symptoms are the very same that have been given as premonitory of normal dentition, and in odontalgia, with the addition of intense injection, swelling, and heat of the gums and mucous membrane of the mouth and pharynx. We are justified in doubting whether all these cases have been primary gingivitis, or whether or not the affections of the mouth and pharynx have been the primary diseases; the more so when we again are told of the presence of the very same symptoms as above, and moreover learn, that the gums will not only tolerate a moderate pressure while inflamed, but the patient feels relieved. That there can be a severe inflammation of the gums, in connection with the protrusion of a tooth, is proved by the difficulty sometimes, though rarely met with, by the protruding wisdom tooth, resulting from insufficient room, &c., but very rare it must be, as the termination in suppuration has been observed by but very few men, and but very seldom altogether. We are the more justified in so presuming, as we know of a number of cases of very severe and general stomatitis without the least affection of the gums, and of others where the gums were immensely swelled without injection, heat, or pain; and as the gums are generally very little apt to be affected by inflammatory action. Ulcerations of the cheeks in the immediate neighbourhood, or even anomalous protrusion of teeth, either deciduous or permanent, through the gums and alveolar process, in an oblique direction, are but seldom found to give rise to an inflammatory process in the gums.

Odontitis, or inflammation of the tooth, is the third local affection sometimes attributed to dentition. Again the same symptoms, pain, injection, swelling, are enumerated, and described as very intense and obstinate. Recovery would not always take place, although it would be the result, after days or weeks, in the majority of cases; but death would sometimes ensue under the symptoms of a thorough affection of the nervous system, or of a "typhoid fever." It would often be combined with other diseases, and, according to Schönbein, not unfrequently with rachitis. Jahn has made a number of post-mortem examinations in cases of odontitis, and what did he find in such children who died from inflammation of a tooth? Why, hyperæmia of the brain, acute hydrocephalus, "gastromalacia" and always violent inflammation of the gums and alveoli, with sometimes a dark blueish colour of the alveolar margin. This latter shows certainly injection, but the former proye those children to have suffered from, and died of cerebral diseases. The connection of rachitis also points to the slight importauce of the local affection, showing that the principal danger has been observed to be derived from constitutional or local ailings, not at all depending on, or connected with, the local process of the protrusion of a tooth. I have to state, finally, that there is no such thing as odontitis proper, the dental tissue being too hard and deprived of vessels for an inflammatory process to take place. What has been called by this name, is either endodontitis, or perodontitis. The former is inflammation of the inner dental pulp richly endowed with nerves and vessels, in which stasis and chemical changes may take place, and intense pain be felt, and central caries brought on. This form will sometimes be observed, but in advanced age, and not rarely in very robust and otherwise healthy men. Perodontitis is inflammation of the periosteum surrounding the root of a tooth, producing a beating pain, especially in the warm temperature of the bed. The tooth appears to be elongated, and feels sore on pressure, until either recovery has taken place or suppuration, which will permit the tooth to be removed without much difficulty. That the gums suffer simultaneously, is but natural. But this affection is also observed, almost exclusively, in adults.

TREATISE UPON THE GENESIS AND DEVELOPMENT OF THE DENTAL FOLLICLES TO THE EPOCH OF THE ERUPTION OF THE TEETH.

By Drs Ch. Robin and E. Magitot.

(Translated for the 'Dental Cosmos,' by E. Sureau.)

(Continued from page 460.)

CHAPTER THIRD.

STRUCTURE OF THE PRODUCTIVE ORGANS OF THE TOOTH, GENESIS AND DEVELOPMENT OF THE TISSUES WHICH COMPOSE IT.

The dental follicle, considered as a whole, has reached the period of complete development at the moment when the phenomena of genesis and development of the tissues constituting the tooth (ivory, enamel, and cement) exhibit themselves. Each of the parts of which it is composed has been subjected to modifications of intimate structure, the accomplishment of which precedes the *début* of its physiological *rôle*. We will now examine correlatively, on one hand, the anatomical structure of each productive organ, and on the other, the office which it fills; these subjects will be considered in as many distinct paragraphs, which will form the subdivisions of the present chapter.

Section 1. *Structure of the Dental Bulb or Germ of the Ivory.*—We have already described the different modifications of form and size of which the dental bulb becomes the seat, from the moment when it appears near the bottom of the groove until the commencement of the production of the ivory; it now remains for us to determine exactly the intimate structure of the organ at the time of the commencement of the phenomenon of *dentification*, and during its continuation.

When the dental bulb of the vertebrata is examined comparatively in the heart of the follicle, we are struck, as we have already stated, with the uniformity of the type of general configuration which the organ exhibits between different individuals in each species of teeth. Besides the differences of size, it is impossible to confound the bulbs of the incisors with those of the canines or molars, either in the same species or different ones, and that during all the phases of evolution This particularity will exonerate us from giving a special description of the bulb for each species of animal successively, the form of the bulb being an exact repetition of that of the crown of the corresponding tooth. On the other hand, the analogies of intimate constitution are not less striking. To give the description of the bulb in due order, we will treat successively—A, the proper tissue of the bulb; B, its vessels; C, the nerves; D, some secondary particularities of structure such as the production of calcareous grains, &c. interiorly.

a. Proper Tissue of the Dental Bulb.

The tissue of the mass of the bulb is composed of ovoid nuclei, sprinkled in great number through a slightly-granulated, transparent, homogeneous substance, and which are at a later period accompanied by laminated fibres, vessels, and nerves.

TISSUE OF THE BULB IN THE FŒTUS.—As we have previously stated, these nuclei are analogous to the embryo-plastic elements, but they are of a darker grey, less clear at the centre, because they are more granulated; the granulations being greyish, quite dark, and slightly brilliant at the centre. These nuclei have no nucleole; whereas the embryo-plastic nuclei, properly so called, which are mingled with them near the junction of the bulb and the wall, usually have one. They are smaller and of a less elongated ovoid than the latter, for they are only from seven to eight-thousandths of a millimetre in length, rarely reaching nine-thousandths. Finally, their outline is darker They are, however, insoluble in acetic acid, and strongly resemble, in general appearance, those which are found in the bulb-tissue of hair and feathers. They approach each other without being contiguous, and the interval separating them, which is filled with amorphous matter, is from one to four times their diameter, according to age and region of the bulb: thus, in aged subjects they are a little more removed from each other, and also nearer to the edge than the centre of the bulb or of its projections. These nuclei are quite generally disposed parallelly to each other, and their greatest diameter is as commonly parallel to the vertical axis of the bulb; this arrangement is very evident and very elegant in the long and thin prolongations which, from the base of the bulb, penetrate into the divisions of the crown in the ruminantia, pachydermata, &c.

The amorphous matter interposed between the nuclei is tenacious, elastic, and quite resistant under the needles used in tearing it. It is remarkably transparent near the surface of the bulb, and in the prolongations which will be examined hereafter. It is sprinkled with fine molecular granulations, which are more abundant near the centre than at the surface of the bulb. This amorphous matter is clearer and more transparent in animals recently killed than in those which have reached or passed the period of cadaveric rigidity. Like various species of anatomic elements, and solid or semi-solid amorphous substances, this suffers after death a sort of coagulation, which renders it finely granulated at some points where it was not so previously.

It enters into the constitution of the bulb of the true embryo-plastic nuclei; but they are found especially near its base, and at the place of its continuity with the follicular wall.

Subsequently to the appearance of the vessels, which will be considered later, a certain number of these nuclei become the centre around which originate the fibro-plastic bodies which are found with the preceding elements in the heart of the bulb-tissue from about the fifth month' of the inter-uterine life in man, and which at a later period reach the condition of laminated fibres, properly so called

These fusiform or star-like fibro-plastic bodies are quite rare; they are met particularly near the adherent base of the bulb at the place of its continuity with the follicular wall. The generation of these fibro-plastic bodies is effected in consequence of a series of phenomena of evolution which have the embyro-plastic nucleus for their centre.

A prolongation originates on two opposing points of the nucleus: this prolongation has a quite clear outline, but is pale and loose in texture; it is cone-shaped, the base corresponding to the nucleus which it surrounds, and the tapering extremity follows a rectilinear direction, when the amorphous matter around it is abundant and the nuclei rare; and, on the contrary, takes a sinuous or irregular direction when the nuclei are pressed against each other. The nucleus comprised in this way between two conical prolongations becomes fusiform (fusiform fibro-plastic bodies). It is merely necessary to remark that these prolongations are not formed at the expense of the substance of the nucleus, for they are produced around the latter as a centre of generation. In some elements it originates upon the different points of the circumference of the nucleus, and this is soon surrounded with more or less numerous rays (star-like fibro-plastic bodies), which ramify and anastomose reciprocally. They thus form at the points where they exist, and when their evolution into fibres is completed, the net-work or woof of laminated fibres of the pulp, in the meshes of which the elements of the organ are mingled.

When the fibro-plastic bodies have reached the condition of laminated fibres in consequence of the phases of their development, their nucleus atrophies and disappears, whereas the new nuclei undergo the same evolution at the heart of the organ.*

A fact worthy of remark in the study of the texture of the bulb in subjects of different species but of corresponding ages, is, as has been mentioned, the complete identity in the anatomic composition of that organ among vertebrated animals, and consequently the analogy in the appearance of the tissue under the microscope, whatever the differences of form and size may otherwise be. There is especially the same mode in the distribution of the nuclei in the amorphous matter, the same manner in the arrangement and configuration of the fibro-plastic bodies, situated in the neighbourhood of the base of the bulb near the point of continuity with the follicular wall. In this latter point it is proved that the tissue is always more transparent than in the rest of the organ, and the fibro-plastic, star-like bodies can be more readily found there, plunged in a transparent amorphous matter, which is less granulated than in the other parts. Finally, the tissue of the organ is much more transparent on the free edge of the bulb than elsewhere, because the amorphous matter predominates there over the nuclei. The only particularities between the different groups of mammifers which are worthy of notice are, that the tissue sometimes shows great transparency, and that the nuclei as well as the amorphous matter are very pale (ruminants); at other times the amorphous matter is more granulated, the nuclei and fusiform bodies darker (pachyderms); or else the star-like or fusiform fibro-plastic bodies are more numerous than the nuclei near the adherent base of the bulb (man and the carnivora). But the general characters of texture are so decided, that it is always possible to recognise the bulb by its special constitution, in a preparation combining all the component parts of a follicle.

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* These are the fibro-plastic, fusiform, star-like bodies called by Purkinje and Raschkow (1835) "*angular granules united by very loose threads of cellular tissue.*" It is the same arrangement spoken of by Kölliker, Lent, and Hannover, under the name of the *star-like cells* of the dental pulp.

Amorphous Matter and Surface of the Bulb of the Fœtus.—The transparent amorphous matter interposed between the nuclei extends beyond them over the whole surface of the bulb, nearly to its place of adherence to the wall, and is from one to two hundredths of a millimetre in thickness. It thus protrudes, like a relatively thick varnish, beyond the whole portion of the bulb, essentially formed of nuclei and of finely-granulated amorphous substance It is pale, very transparent, and destitute of nuclei and molecular granulation, as has already been pointed out, throughout all that portion which thus extends beyond the fundamental tissue of the bulb. The cells of the dentine originate in the depth of this bed, a little before the vascularization of the bulb for the follicles of the first dentition, and a little after that vascularization for those of the second dentition ; so that it is only so disposed so long as these cells have not appeared, or in those parts only where they have not yet originated.

It has already been remarked that the surface of that portion of amorphous matter is more dense than the subjacent portion, and crumples easily in the processes of the preparation, forming very thin and elegant folds, which spread from the edges or apex of the bulb towards the middle of its surface.* There is a continuity of substance between this superficial bed and the subjacent amorphous matter. Maceration in water sometimes separates these two parts ; it is then possible to see it under the microscope, detached from the rest of the organ and floating in the liquid of preparation in very delicate membraniform strips ; a result arising solely from the difference in the density of the two parts, and their unequal resistance to the method of preparation.

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* This is the bed which, since Raschkow, has received the name of *membrana præformativa*, from an idea adopted by many authors, but which has since been recognized to be false—viz., that the ivory proceeds from it. (Raschkow, *Maletemata circa mammalium dentium evolutionem.* Vratislaviæ, 1835, 4to, p. 5.) Todd and Bowman have called it *the transparent homogeneous membrane forming the surface of the dental pulp.* (*Physiological Anatomy, London*, 1847, 8vo, p. 176.) They are wrong in considering it as a remnant of the reflexion of the epithelium of the sac, or follicle, modified in its structure. Markusen is also incorrect in asserting that the *membrana præformativa* is nothing other than the part of the bulb which is first changed into bone. (*Sur le développement des dents des mammifères. Bulletin de l'Académie Impériale de Saint-Petersbourg*, 1850, 8vo, vol. viii. p. 314.) Hannover is not more correct in considering it as the most external bed of the cells of the dentine. (*Ueber die Entwickelung und ben Bau des Saugethierzahns. Verhandlungen der Kaiserlichen Leopold-Carolinischen Akademie der Naturforscher.* Breslau 1856, 4to, vol. xxv, p. 12.)

When the tissue of the bulb is torn, the superficial bed is detached from the subjacent part in extremely transparent strips, which have no granulations or striæ, and are so thin that the thickness cannot be measured by two lines. It ceases where the transparent amorphous bed, mentioned above, ends, that is to say, near the junction of the base of the bulb with the wall. When the cells of the dentine originate, and form a range in the surface of the bulb, in the amorphous matter which they supersede, there still seen extended above them that denser superficial portion, which can be detached in strips, and which continues until the time when the cells change into the condition of ivory. At that period it disappears, by gradual atrophy, from the centre to the periphery, that is to say, starting from the summit of each of the hollow cones or caps of dentine which have appeared on the bulb-projections.

So long as the dentine is not yet formed, the free surface of the bulb exhibits an edge which is clear and well delineated, although very transparent and very pale. This disposition is owing to the nature of the superficial bed of amorphous matter, which will be examined hereafter.

Changes which occur with Age in the Texture of the Bulb.—It has been stated above, that in the first dentition, it is some days after the appearance of the cells of the dentine, at the summit of the bulbs, that the vessels are developed in the depth of the latter; and that, on the contrary, this occurs some time before that period in the bulbs of the second dentition The nerves show themselves in the bulb shortly after this vascularisation.

At the same time that the preceding phenomena are accomplished, the production of a great number of laminated fibres occurs in the heart of the bulb. This is the result of the ulterior evolutions of the fusiform and star-like fibro-plastic bodies. We will now exhibit these changes in order not to interrupt the description of the general texture of the bulb, and we will afterward describe the disposition of the vessels and nerves.

The consistency of the bulb is gradually augmented, in consequence of the fibro-plastic bodies changing into the condition of laminated fibres, and of the incessant production of the latter.

The multiplication of the fasciculi of laminated fibres has the effect of not only increasing its resistance, but also of diminishing its transparency, which renders examination more difficult. A certain number of embryo-plastic nuclei are found in the intervals of these fasciculi and in their depth. These nuclei are made more visible by the addition of a drop of acetic acid in the preparation. The amorphous matter, in the midst of which these elements are enclosed, is greyish and finely granulated, and of a very much more considerable consistency in aged subjects than in the young, a circumstance which concurs to give the bulb a resistance which increases during the course of life.

The modifications of the bulb are accompanied by a gradual diminution in the breadth and thickness of the organ, at once absolute and relative, the organ elongating considerably in proportion to the development of the roots below the dental crown. This radicular portion of the bulb is slender, becoming more and more so with age, and yet it is hard to break, being more tenacious and resistant than the part which fills the cavity of the crown; for the texture of this organ exhibits many particularities in relation to its form. It follows, from these changes, that the bulb of the uniradicular teeth is club-shaped, the contracted portion more or less long, and thinner in proportion to the advanced age of the subject. In the multicuspids the coronal part is elongated at its base in as many contracted portions as there are roots.

These slender or radicular prolongations owe their resistance to the fact that they are formed entirely of laminated fibres united into fasciculi or parallel sheets, surrounding the vessels and nervous tubes, which are also arranged in close bundles. Acetic acid reveals some embryo-plastic nuclei in these fasciculi, or sheets of laminated fibres. They are accompanied by a little finely-granulated, transparent, amorphous substance, which in some sort imbeds them; but no ovoid neuclei proper to the bulb-tissue can be found in this amorphous matter at this level. The laminated fibres are fine, and disposed parallelly to each other, rectilinear or a little undulated; thus, the tissue of the bulb is easily torn lengthwise, but not so readily across.

Following these fibres in the swollen or coronal part of the bulb, we find them separating from each other in the form of loose fasciculi or sheets, crossing each other. At the same time there is a larger quantity of amorphous matter than in the radicular portion of the bulb, a fact which coincides with the greater softness of that coronal part.

This amorphous matter is a little firmer than in the fœtus; and, as we have stated, it is a little more granular and less transparent. It extends some hundredths of a millimetre beyond the central part occupied by the fibres, and forms the superficial portion of the bulb; but the loops of the capillary vessels reach as far as its surface, even when the evolution of each tooth is completed. At this period, also, this substance is in direct contact with the lower face of the ivory; while, as long as the root has not reached its full length, a range of the cells of the dentine is found between the substance of the bulb and that of the ivory. However, the superficial part of this amorphous matter is more dense than the subjacent portion in the completely-developed teeth of the infant, as well as in those of the adult; it becomes detached in thin, transparent, membraniform strips, analogous to those which are separated from the surface of the bulb before the appearance of the dentinal cells, and have been called the *membrana præformativa.* These strips detach themselves less readily, and over a less extent, on the bulbs of developed teeth, because the subjacent matter is more firm. Moreover, their substance is finely granular, and, finally, it draws away, in places, some of the peculiar nuclei of the substance of the bulb.

The amorphous matter of which we are about to speak is, indeed, sprinkled with these nuclei, as during the fœtal condition of the bulb, and they are found at two or three thousandths of a millimetre from the surface even of the coronal portion of the bulb, that is to say, almost in contact with the ivory. These nuclei are more rare and more distant from each other than during the fœtal period; they are more numerous near the surface of the bulb than in its depth, where they become rarer and rarer; while, on the contrary, the fibres are more abundant. These nuclei resemble those of the fœtus, except that they are a little more elongated. It is also to be marked that the tissue of the coronal portion of the bulb is softer at the surface, where they abound, than in the lower part where the fibres predominate.

b. Vessels of the Bulb.

Near the period when the bulb reaches a breadth of about one-half or three-quarters of a milimetre, it begins to become vascular. We see at first one or two vascular loops extending into the thickness of the base; but in bulbs of only a millimetre, or a little more, many other loops can be seen detaching themselves from these, and advancing toward the surface of the organ. They do not reach it, however; they do not penetrate even as far as the superficial bed of the amorphous matter which is without neuclei, and which forms the surface of the bulb. So long as the coronal portion of the latter is not covered with ivory, the extremities of the loops remain at about three or four hundredths of a millimetre from the surface.

A small artery, from one to two-tenths of a millimetre in diameter, and reaching but little beyond this volume at any age, followed by one or two small corresponding veins, show themselves at the base of the bulb or of its radicular part, according to the age. In proportion as they reach the narrower part of the dental germ, near its coronal portion, the vessels subdivide a great many times at very short intervals. When the bulbs are still small, each afferent capillary only curves loop-like near the surface of the organ, and returns directly to the venous trunk as an afferent capillary.

In the whole of the divisions and loops, these vascular arrangements, while very simple, are extremely elegant. Many of the capillaries fold back upon themselves, in the shape of the figure 8, near the loop extremity, at the point where they change from efferents into afferents In addition to this, they describe some flexuosities, or very close and short undulations. The distance between these capillaries is about two to four times their own diameter, and continues nearly the same during the whole existence of the bulb

By taking follicles more and more voluminous. until the teeth are fully developed, we find that when the loops are elongated their capillaries communicate by transverse branches, which become more and more numerous, and thus divide them into polygonal meshes with rounded angles, the diameter of which is from three to four times that of the capillaries which circumscribe them. The whole is very elegant on well-injected bulbs, or, better still, on the well-congested bulbs of suffocated animals, or on certain diseased teeth which have been extracted. We have already said that in the completely-developed teeth of infants and adults the loops, or rather the most exterior meshes, extend to the surface which touches the ivory, and are only separated from it by a certain thickness of bulb substance, as before the genesis of the ivory.

Dilaceration of the tissue readily occasions the isolation of some capillaries, and permits it to be seen that their structure is the same as in the generality of the other tissues.

The association of these numerous capillaries in the woof, previously described, gives the bulbous tissue a rosy, grey colour, nearly semi-transparent. This colour changes to a purple red, or most intense violet, in inflamed bulbs, and besides we sometimes see some broken capillaries, and here and there small bloody effusions, forming a very fine picket at the surface or in the depth of the organ. In these circumstances, we can clearly establish the varicose disposition, with short intestiniform folds, of the capillaries, distended by heaped up and coherent *hematies* without any trace of serum between them, as is generally seen in other inflamed tissues. It is difficult by description to give any idea of the elegance of this vascularity, and the precision with which it is seen by the observer, when the examination of a sufficient number of pieces allows him to fall upon those which present the circumstances favourable to their study.

It occasionally occurs in man, and in the various domestic mammals, that the bulb of a tooth is very pale; while, on the contrary, those of the neighbouring teeth are congested and reddish. This is observed, particularly in those of the first dentition, where the roots have begun to be atrophied, in order that they may be soon replaced. In this case, and in exsanguinous dead animals, the tissue of the bulb is gelatiniform, semi-transparent, of a pale, grey colour, and very delicate in appearance. There are, in this case, only a small number of capillaries full of blood.

c. Nerves of the Bulb.

In man there are generally two fasciculi of nervous tubes in each of the radicular portions of the bulb. There are sometimes three or four, especially in the large mammifers. These fasciculi are only a little more than one-tenth of a millimetre in breadth, but often reach only half this diameter, or a a little more. They are nearly rectilinear, and are removed from each other, being separated by the vessels and fibrous fasciculi of which we have spoken. They are formed by thin tubes, immediately contiguous to each other, without capillaries in their interior, and surrounded by a very thin involucrum, which holds them strongly pressed together. We can trace these fasciculi as far as the coronal part of the bulb, and observe their subdivisions; but these subdivisions are lost to sight in the thickness of the latter, the opacity of which prevents them from being followed. We can, however, observe the manner in which a certain number of these tubes terminate in the projections which surmount the coronal part of the bulb, and which bury themselves in each of the corresponding projections of the free edge or triturant surface of the dental crown.

In the incisors of man, and the carnivora particularly, the coronal part of the bulb, flattened into the shape of a wedge, is surmounted by as many very delicate and elegant small, conical, transparent prolongations. They start from the free, or trenchant edge of the bulb. These are two lateral ones, one at each angle, and a middle one, which is the longest. In the ruminating animals there are also larger and longer prolongations, which surmount the coronal part of the bulb of the molars; they are very transparent, and it is easy to trace one or several capillary loops and several thin tubes, slightly separated from each other. They terminate in the same manner as in man and the carnivora.

In the latter, in each of the prolongations loosened from the edge of the bulb, there is a single capillary loop, at the side of which creeps a thin, nervous tube. This tube sometimes occurs only in the middle prolongation, and is wanting in the others. It terminates at the distance of from three to five-hundredths of a millimetre from the extremity of the latter, while the vascular loop, which it runs over, reaches as far as the summit. Before it terminates, the tube becomes gradually attenuated, but without subdividing; the extremity is disposed in a blunt point, transparent and difficult to see, because the fatty contents, which strongly refract the light, cease a little before the termination of the wall itself. This terminal extremity of the nervous tubes must always be looked for near the vascular loop.

(To be continued.)

ALVEOLAR ABSCESS.

By JAMES E. GARRETSON, M.D.

(From the 'American Medical Times.')

Periodontitis, or inflammation of the alveolo-dental periosteum, has its sequel, alveolar abscess. This disease, so common as to be familiar to almost every one, known as gum-boil, would scarcely be worthy a distinct review, were it not that occasionally it assumes such strange phases as to make its recognition a matter of the utmost difficulty. Because, therefore, of these phases, its pathology commends itself to our attention.

The local features of an alveolar abscess may be described in a very few words. At the apex of the fang of the diseased tooth, a sac forms (the old pyogenic membrane of the books). This sac, as it enlarges, makes for itself, through the absorbents, a cavity in the alveolar process; the formation of pus results in pressure on the bony parietes, the most vulnerable wall of which is absorbed, thus allowing the escape of the matter to the soft parts: this last, of course, soon yields, fluctuation becomes very perceptible, the matter vents itself, escaping into the mouth. The cure of an alveolar abscess depends upon the breaking-up of this sac, and the filling-up of the cavity with healthy granulation.

As periodontitis may not unfrequently be aborted by scarifying the gums very freely and deeply, and, after the congested vessels have relieved themselves, constringing the parts by applications of strong tinct. of iodine; so alveolar abscess can, in the majority of cases, be aborted by the following trifling operation:

With a sharp scalpel, make a slight cut through the soft parts at the apex of the affected tooth; next take up a spear-pointed drill and pierce through the outer plate of the bone into the cavity in which the sac is being developed, break up this sac, and, by means of a delicate tent, keep the wound patulous for a few hours.

This little operation is, I believe, original with myself; indeed, I do not know that it ever has been performed even yet by any one else; but I am well assured, through a pleasant experience, that it very commonly spares the patient upon whom it is practised days of excruciating torture which belongs to the formative stage of this disease. The philosophy of the operation will be at once recognised, I think.

I cannot here help excepting to the common practice of ordering blisters and warm fomentations to the face in incipient abscess: the practice is very objectionable, and not unfrequently results in scars which much deform the patient. If the practitioner should not desire to adopt the operative suggestion I have offered, let him order a roasted fig or raisin directly to the affected part; either of these will do equally well the work of the blister or poultice.

A specific and speedy treatment for alveolar abscess in its developed stage was given in the previous paper.

The anomalies of alveolar abscess, if such a term might be applied to conditions not at all unfrequent, may, perhaps, be best studied through the medium of examples. I select a few from my own practice and that of other gentlemen. If, happily, they may serve to throw light on some obscure case at present bothering some young practitioner, I shall feel well repaid for the trouble of jotting them down.

About two years ago I saw, in consultation with a Dr B. of this city, Mrs ——, who had been afflicted with a running ulcer at the apex of the chin for four years. During this period the lady had been under the care of some five or six different practitioners, and had twice been operated upon for supposed disease of the bone.

Suggesting that the origin and cause of this fistula might be found in some diseased tooth, I was assured that these organs had been most carefully examined, and that there was not an unhealthy tooth in the mouth,

A superficial examination seemed to verify the truth of the assurance. Not satisfied, however, with such examination, with a steel instrument I commenced striking each tooth separately: the patient thought that in the left inferior lateral incisor she experienced a sensation differing from that of the others.

Placing her now in the full sun-light, I reflected the rays over the teeth by means of a hand-mirror: this test satisfied me that the incisor alluded to had lost its pulp—it showed a slight opacity.

I was now convinced that the disease was alveolar abscess, and predicated, on my examination, that an opening made into the affected tooth would discover the death of its pulp: this was done, and the tooth found dead, as anticipated.

The offending organ was extracted, some necessary local attention given the sinus, and the patient was well in a week.

Comment on this case scarcely seems necessary, and yet it may not be amiss to suggest the explanation of the deceptively healthy appearance of the dead tooth.

When the pulp of a tooth dies, discoloration of the enamel is the common result; this discoloration being caused by the absorption of the dead matter by the tubules of which the dentine is made up. Occasionally, however, the opacity is so slight as to be scarcely perceptible; and this depends on the dense character of the tooth—not unfrequently the tubules being so nearly occluded as to destroy their capillarity—the dead pulp is not therefore taken up. A very vascular tooth, having a dead pulp in its cavity, will soon be turned almost black.

A dead tooth, however, can always be distinguished by the tests which I have given.

The pathology of this case may be summed up very briefly. The death of the pulp provoked periosteal difficulty. The inflammation, uncombated, resulted in alveolar abscess. The pus, after inducing by its presence the absorption of the bone, dissected its way under the soft parts down to the apex of the chin, where it discharged itself—the abscess passed into the chronic stage, and thus the annoying and formidable fistulous ulcer was of course rendered incapable of being healed by any directly local treatment.

In another consultation saw Miss B———, a young lady, nineteen years of age. In this patient, a fistula in the very centre of her hard palate had existed for some two years, giving rise to great uneasiness (as it had refused to yield to much treatment), a cancerous cachexia existing in the family.

The denture in this mouth was also so complete as not to have attracted observation, every tooth being perfect, with the exception of a single molar, which tooth had a small filling of gold on its grinding surface. The filling in this tooth was removed, and the pulp found dead. Extraction was resorted to, and in three or four days all discharge had ceased. On the sixth day the patient was dismissed cured.

It is not at all uncommon to find the sinus of an alveolar abscess venting itself somewhere on the cheek. This is too frequently the result of inviting the matter to the surface by the warm applications made to the side of the face. When pus thus seeks the surface, it should be vented from the inside of the cheek. The operation is very simple, and will be successful if the pus should have found its way even so far externally as to have but the skin between it and the atmosphere. Care must, however, be taken not to wound the facial artery or the duct of Steno.

Abscess associated with the wisdom teeth, sometimes vent in the parotid region; in these cases it is not uncommon to find the orifice of the fistula as low down as the clavicle, the unyielding character of the parotid fascia—a continuation, as it will be remembered, of the deep cervical—compelling this lengthened dissection.

Another, and indeed very curious result of alveolar abscess, is the formation of osseous cysts on the side of the jaws: the pus, instead of inducing the ordinary absorption, is provided for by the expansion of the outer plate of the bone. These cysts give no sense of fluctuation or crackling on pressure; there is no appearance of surrounding inflammation, the soft parts covering them does not differ, in any respect, from the adjoining tissue. I have found such cysts or tumours generally associated with teeth in which the pulps have been destroyed and the fangs filled with metal. They form, sometimes, very rapidly. I have treated them where the cyst has enlarged to the size of a hickory-nut in a single week. This rapid growth is particularly diagnostic.

The easiest treatment is, of course, the extraction of the offending tooth; but they may, also, be readily cured by opening them transversely and stuffing the cyst with lint, saturated with tinct. of iodine, or some other stmulant: the cyst is thus obliterated, and the sac at the end of the fang destroyed, through the healthy inflammation which the treatment excites.

These tumours are not to be confounded with the encysted tumours of Paget, of which mention will hereafter be made.

Mr Smith, in illustrating a lecture on alveolar abscess, notices the following cases from his practice:

A few years ago, he says, a middle-aged man asked his opinion about a fistulous sore which opened on the middle of the whisker of the right cheek. Mr S introduced a probe, and finding that it came in contact with the fang of the last molar tooth of the upper jaw, persuaded the patient to allow him to extract it, on the promise that he should be well in a few days. On the tenth day the gentleman wrote, by post, to say that the discharge ceased the day the tooth was extracted, and that, at the time of writing, it was perfectly well.

He relates the case of a young woman who came under his charge at the infirmary, with a fistulous sore in the fore part of the throat, within an inch of the sternum. It had been discharging upwards of a year. On probing it, the instrument could be passed in the direction of the molar of the lower jaw on the left side. On inquiry, the patient said that eighteen months before she had a tooth drawn, but the fangs had been left in the jaw. Afterwards an abscess formed, which descended lower and lower until it burst midway between the sternum and pomum Adami. Mr S. extracted the stump; it still discharged for a week, when it got well without other treatment.

Mr S. alludes, also, to a case where a horse had been condemned to the knacker's yard, as being afflicted with glanders, having a foul offensive discharge of purulent matter from the nostrils and being in the last stage of emaciation. A veterinary surgeon, finding that it could masticate its food, examined its mouth, and detecting a carious tooth in the upper jaw, extracted it. The discharge ceased; the horse soon began to thrive, and got well.

Mr Fleischman ('British Medical Journal') relates the following example:—" Miss Rose S., a little girl, aged five years, had been troubled about three months with a constant, though not profuse, discharge of slightly-purulent mucus from the right nostril; it appeared to be the sequel of a cold. The mucous membrane, so far as it could be examined, was healthy, and there were no indications of any morbid growth. She was ordered a strong injection of gallic acid, and took, concurrently, small doses of the sesquichloride of iron The only advantage she derived was that the discharge lost its purulent character; in amount it remained about the same, though the treatment was long persevered in and other local astringents tried. I suspected," says Mr F., "there must be some undiscovered local irritation. Not being able, on careful examination, to find anything wrong in the nasal passages, I looked to the condition of the teeth, and finding the right upper canine carious, removed it. The discharge was much lessened on the next day, and, in the course of a day or two, disappeared altogether."

Mr Fleischman, although he does not see that his case is simply one of alveolar abscess, but offers it as "a good illustration of reflected irritation," truly remarks that it "teaches us that the *fons et origo mali* is not always just where we might expect to find it."

I have had, in my own practice, several cases where the pus of an alveolar abscess discharged itself from the nares; but the disease, in every case in which I have seen it, where the sinus passed in such direction, was associated with the central incisor teeth.

These few pages, and these few examples, will, I trust, illustrate with sufficient clearness this particular lesion, and serve to place the practitioner on his guard when such anomalies may present.

PROCEEDINGS OF DENTAL SOCIETIES.

COLLEGE OF DENTISTS OF ENGLAND.

CONVERSAZIONE.—OCTOBER 8TH.

On Tuesday evening, October 8th, the members of the College of Dentists commenced the Sixth Session of the College at their rooms in Cavendish square. There was a full attendance of members and visitors. The meeting was opened by an address from the President, George Waite, Esq.

He reminded the members that time with its rapid flight had already brought them to the beginning of the Sixth Session of the College, and began to confer upon it a portion of that stability and respect which attached themselves to established institutions. He congratulated the Meeting upon the success which had attended the College during the past year. He regretted that unprovoked attacks and mis-statements still continued to be made against the College, but that little importance was to be attached to them, knowing the source from whence they emanated. In a few days the third session of the Metropolitan School of Dental Science would commence, and he was pleased to be able to add that the number of pupils now entering augured most favourably for its continued success. Another event of great importance was the establishment of the National Dental Hospital, which would be shortly opened, where the poor, who suffered greatly from the ill-effects of diseased teeth, and the injurious results which arose from the loss or diseased condition of these organs, would receive those benefits which were sure to accrue from the formation of such an Institution, and from which they had hitherto been debarred, from the impossibility of procuring the necessary assistance. He described the favourable position of the German Dental movements, and the Convention lately held, at which practitioners from various parts of the country attended, and showed what might be done where unanimity and good feeling prevailed. He regretted that no organisation had as yet taken place in France, but he trusted that the professional men in that country would soon clear away all the impediments that had hitherto existed to the attainment of so desirable an end.

In speaking of the progress of Dental Science in America, he named to the meeting that a correspondence had gone on last year as to the advisability of a world's Dental Convention that the matter had then dropped, but that next year appearing favourable to the project the correspondence had been resumed, and the College had tendered to their American brethren a special welcome should they visit England next season.

This communication had received a very flattering answer, and an invitation had been issued to members of the Union to join the World's Dental Convention to be held in London next year.

The worthy President suggested that a Committee should be formed to take into consideration the best manner of ensuring a hospitable reception to our transatlantic brethren, who for many reasons were entitled to our sympathies.

He wished the Profession generally to decide what steps should be taken for that purpose; it was to be hoped that all party-feeling would at such a time be laid aside; the College was ready to follow or to co-operate with any and every member of the Profession, whatever their political views might be, who were prepared to take the initiative on that interesting occasion. Mr Waite concluded a concise and appropriate address by impressing upon the members the necessity for union, and for each individual using every effort for carrying out the objects of the College.

In the rooms were a variety of objects deserving of more than a passing notice, and intended to illustrate the progress made in Dental Mechanism during the last twelve months. Messrs Ash and Sons, with their usual liberality, exhibited a beautiful case of instruments containing stoppers, scalers, excavators, forceps, and, indeed, every requisite for the surgery, most conveniently arranged, and of excellent manufacture; their new vulcanite flask, now generally employed; a frame for accurately adjusting the bite; a stand for holding instruments, &c., while operating; a number of ornamental hand-mirrors, and a footstool so arranged that any elevation may be readily obtained and suited to every-sized sitter. A new feature in their collection consisted of a very valuable collection of microscopes, well adapted for students in Dentistry, and complete with every arrangement modern science has invented, together with a variety of microscopic objects, illustrating Dental Anatomy, &c. They likewise displayed a case of mineral teeth made after natural models, with and without gum, in single teeth and in blocks of two and three, improvements introduced during the past year.

Messrs Lemale and Co. exhibited a case of mineral teeth, containing complete sets of their now generally-admired natural models, constructed either for vulcanite or plate work. Block pieces, with mineral gum, and also their new mineral pivot tooth.

Mr **Rutterford** brought forward his new Porcelain Impression Trays, certainly a great improvement upon the ordinary metal ones, in being exceedingly clean looking, and easily kept so. The greatest drawback is their liability to break. A correspondent in our present number suggests the practicability of their being made in glazed iron; if this could be accomplished, the ordinary pewter trays might be well dispensed with. Mr Rutterford also introduced his Gutta-percha Racks, a very useful arrangement for assorting instruments in a tray or case. Mr Mathews displayed a new kind of gas blow-pipe, where the current of gas or air can be regulated to the greatest nicety by valves placed on the blow-pipe itself.

Mr **Williams** brought forward his vulcanite obturators, most ingeniously devised, as an improvement upon the gold palate. He also exhibited many very beautiful specimens of vulcanite work.

Mr **Weiss** exhibited manufactured specimens of all the best Rubbers at present before the Profession, consisting of Childs' G, both by steam and dry heat, also with Childs' Gum, Lemale's first and second quality, Rowney's Thionized orange, Blackwood's new Coraline Vulcanite, Faulkner's orange and also his Neutral Tinted Rubber, both before and after being bleached by exposure in spirits, also the experimental pieces of work which formed the illustrations to his paper on "Hardened India Rubber.

Various scientific objects, not directly connected with dentistry, were distributed in different parts of the rooms. To Mr Waterhouse Hawkins, the well-known restorer of the various extinct animals, the Society was indebted for several life-like diagrams of the Gorilla, and a cast of the head and teeth of the rare extinct Machairodus.

The Universal Private Telegraph Company exhibited their very ingenious and easily managed apparatus which, as they correctly state in their prospectus, any person can work as accurately as he can write, though perhaps not quite so rapidly. The instrument was busily engaged throughout the evening in conveying messages for the satisfaction and amusement of the company. Another object which attracted considerable attention was the Elastic Block Printing machinery, by which drawings can be transferred and enlarged or diminished at the pleasure of the operator.

The Stereoscopic Company exhibited several very elegant forms of this well-known instrument. The views were many of them exceedingly beautiful, and perfect specimens of this delighful art.

Refreshments were served in the Picture Gallery, where there was ample room for the members to converse together, and hold that kind of general intercourse which can only take place at such meetings as the conversaziones of the College of Dentists. The whole of the arrangements appeared to afford satisfaction to the members, and reflected credit on those under whose care and management they had been carried out.

METROPOLITAN SCHOOL OF DENTAL SCIENCE.

THE Third Session of this School was commenced on Thursday evening, October 10th, when the Introductory Address was delivered by Dr Richardson. The large room of the College was filled by a crowded and attentive audience, a very large proportion of which consisted of the junior members of the Dental Profession, or of those who are about to enter it. The President of the College of Dentists, Mr Rymer, the Lecturers and their friends, and many Members of the Dental Profession, were amongst the audience.

Dr RICHARDSON, in his introductory remarks, deprecated adverse criticism, as he had undertaken the task in the stead of one of the Professors of the College, who had been obliged, in order to carry out more important duties, to give up his chair. He was about, he said, to address a class of young men coming first into London life in pursuit of a specific science. His duty, perhaps, was to tell them in what position they would find science in general, and that science in particular which they had undertaken to study. He might congratulate them; for never in the history of science, or in the history of mankind, could they have entered into any scientific pursuit under such happy auspices as at the present moment. Science never stood in a greater or more triumphant phase than at this hour. During the past two years, the hearts of philosophers had beat at the wonders which had been brought to light by recent researches There was an instrument, a mere piece of glass—a prism—about which there was a history which would form the basis of novels in after years. That instrument had unveiled things never thought of or seen before by mortal eye. From its production of the prismatic colours had been rightly inferred the manner in which the rainbow was produced. For many years the instrument had remained a toy; but lately, Fraunhofer, a German philosopher, had discovered in the spectrum produced by it from the sun's rays a series of dark lines, called Fraunhofer's lines. Sir David Brewster had discovered that a peculiar light could be produced, if the rays of light passing through the prism had first to traverse certain gases. Then, more recently, Professor Bunsen of Heidelberg, had found that if, into the flame of a lamp employed to produce a spectrum, the slightest portion of any metal or other element was introduced, there then would be different lines struck across the prism, having a different colour or characteristic for every element. The tenth-millionth part of chloride of sodium could be detected by these means. This great discovery, which was qualitative but not quantitative, was called spectrum analysis. Applying this mode of analysis, Kirschof had discovered in the atmosphere of the sun the same metals as in the earth. Recent researches, also, in connection with spectrum analysis had determined almost to demonstration that, throughout the whole universe, there was diffused an etherial medium which chemists could not touch, and that the heat which we felt was nothing more than the motion of this body. In this way common flame was shown to be exactly analogous to the heat of the sun. Another great advance within the last year was the discovery of Professor Graham, which he called "liquid analysis." Still more wonderful was the great advance made in our knowledge of disease by the synthetical method of research. Up to the present time all that had been done in the study of disease was to collect a great number of diseased conditions, subject them to analysis, examine what remedies would be good in such a case, or to examine what were the conditions of the body in the course of that disease and after it. That method called analysis had no doubt done a great deal of good. But now they took an animal which they knew was susceptible of a specific disease, subjected it to certain conditions likely to produce some particular disease, and from the live animal they deduced absolutely the disease. Thus they produced diabetes in the dog. In another animal they would produce epilepsy; in another animal, cataract; in another, rheumatic fever, with disease of the heart, and all other incident diseases, This was an absolute fact in the domain of medicine, and it would progress until all diseases were producible by human means, and consequently avertible by human prudence. They had lately made great progress with regard to the knowledge of life, and he doubted not that the physical or material part of the problem of life was close on its solution, though as regarded the intelligential part there was a great gulf fixed over which no man had glanced. From this short retrospect of what was doing in the world of science they would see that they were entering on the study of their profession under the happiest auspices. With regard to their own profession, the same remark applied. Only three years ago students could not have had the opportunities offered to them by the institution. They could now in that, and in another establishment, learn that which was demanded of them in their direct practical life, untrammelled by any form or ceremony, without any sacrifice of their independence, and without much sacrifice of their pecuniary resources. This was a great advantage to students in Dentistry, for which they were mainly indebted to Mr Rymer. (Applause.) With these they could connect themselves, and with the encouragement of which they could carry on their pursuit. If it was expected of him to point out what they were to do, and what position they were to take, he would say, let their primary consideration be to do all they could for the advancement of their own profession. That profession had advanced to a great extent; and if he showed them the models around them, they would perhaps think that the mechanical portion could go no farther; but in the course of their instruction they would constantly hear the professor's remark, "We know no more of this subject. It is a matter on which we require elucidation" Let them note down such observations; and while being content to learn that which was taught, let them keep their eyes on such dark places; and in after-life, when they had that leisure which Dentists above all other classes in the same rank of life could enjoy, let them investigate and endeavour to throw light on points which will be interesting to science and to the world at large. Let them take science at large as their study and contemplation. They would find it a great amusement, and a means of introducing them to a host of friends to whom it was a happiness to know and to recollect. It would be relief for the heavier and more mechanical parts of their life, which would always be fraught with pleasure. They must not think, because they were following a special occupation, that therefore they could not follow general science. Fraunhofer, who had detected the lines in the spectrum, found time, while working as a watchmaker, to make a discovery which would render his name immortal. Dalton, who had made the great deduction on which was based the atomic theory in chemistry, had pursued his scientific investigation while working as a shoemaker in Manchester. Let them, too, learn to write good English, so that, while recording every thought, all who read could understand what they intended to convey. Now, with reference to what might be called the moral part of his address, he would remark that, in the ordinary acceptation of the word, he was no preacher. He had no faith in that kind of discourse which was generally a "sounding brass and a tinkling cymbal;" but he would say that there was implanted in the mind of every man a principle which, like the ring which pricked the old philosopher, told him whether he was right or wrong in what he was doing. Metaphysicians had argued as to whether that principle was or was not innate in man. He cared not which it was. He knew it was there. Men called that principle conscience, and by that conscience all great deeds were judged. It was the voice of voices teaching man. It stood above all human ordinances—a revelation without end, telling to saint and saintless in every age the Eternal will, the omnipresent behests of the Most High. Let them, in the course of their lives—whatever their difficulties might be, whatever anxieties they might be placed in—remember this principle of conscience. Let them act by it, and they would be safe now and for ever.

At the close of the address, the President of the College of Dentists proposed a vote of thanks to Dr Richardson for the interesting and attractive lecture which he had just delivered. The proposal was carried by acclamation, and amidst the hearty responses of the audience.

CORRESPONDENCE.

TO THE EDITOR OF THE 'DENTAL REVIEW.'

Maidstone, October 15, 1861.

DEAR SIR,—The enclosed correspondence was forwarded to the Editor of the 'Lancet' for insertion, in reply to the attacks made on me by that journal, but was not acknowledged or published by him. I am, therefore, under the necessity of requesting the assistance of other journals to enable me to reply to charges which I consider most uncalled for, and most unjust.

I am, Sir, yours faithfully,

JNO. COX SMITH.

"Chatham, Nov. 21, 1860.

"SIR,—May I be permitted to solicit your attention to the following facts, which have occurred during the last few years in my practice as a Dentist in Chatham?

"At the conclusion of the Crimean war, Dr Dartnell, then Principal Medical Officer at Chatham, consulted me on the case of a man who had received a gun-shot wound in the jaw, producing much deformity and very great helplessness. I will not trouble you with further particulars now, as I can readily forward them to you if required. The man had passed the Chelsea Board for dismissal, and was then waiting for his papers to receive his discharge.

"I undertook the case, an abstract of which was forwarded to the Queen for her perusal, and was successful with it. This was the first of many cases of like nature, one of which her Majesty specially recollected; and, months after the man's discharge, he was offered a situation in the Royal Household, in which he still remains.

"Now, I would respectfully beg your attention to some circumstances attending these cases. These men were all so far injured as to interfere, not only with their comfort, but with their ability to render themselves sufficiently useful to get employment. One or two could not hold the smallest substance between their teeth, could partake only of fluids and sop: one other could not lie on either side, the only posture for obtaining sleep being on his back; his attempts at speech were quite unintelligible. They would all have been able-bodied men, but the utter inability to partake of any ordinary diet rendered them weak and feeble; and, if I remember rightly, the worst cases that I had under my care could neither read nor write. Had not her Majesty placed funds for these cases, and Dr Dartnell been at liberty to apply for extra official aid, the future of these poor men would have been very different to what it now is, and my Profession would have lost some very peculiar experience. As it was, I believe that some few of the most deserving cases came under my notice, and had the benefit of my aid.

"In addition to these, I had frequently cases sent me from the Military Hospitals for operation, which could not readily be performed by Surgeons' instruments.

"Since then cases have come under my notice, which the ordinary routine of hospital practice could not interfere with. During the period of Dr Taylor's residence as Principal Medical Officer at Chatham, one remarkable for its extent was under my care—a man wounded in the Indian mutiny by a nine-pound shot striking him in the mouth. If I recollect rightly, it killed two and wounded two others besides himself. The whole of the symphysis and lip-section of the lower jaw were carried away, with the exception of a small piece which had become attached between the molar teeth and cheek in the upper. This case I was successful in restoring; and, when I last heard about him, he was mentioned as being but little the worse for his wound.

"Now, if the Medical Officers at Chatham were stationary, it is not probable that I should have troubled you with this communication. So long as, in cases of this sort, they knew to whom to apply, I should have been perfectly happy to have given the services, both of myself and my assistant, with pleasure, though these have sometimes been rather costly; but my time is becoming more occupied, and as professional engagements increase, I find that I have neither time nor inclination, when changes take place in the Medical Staff at Chatham, to call on the recent comers, explain my past position with reference to the hospital, and offer my services for the future. Again, the officers themselves have no authority to apply for extra official assistance, and experience some delicacy in sending these cases to me, knowing that they require considerable expenditure both of time and money; and though I am indifferent on this point, yet it is an obstacle. So long as I personally inquire after these cases, it is well; but they will not readily impose on a stranger matters which require much of his time and something from his purse.

"Now, much of this would be avoided by the acceptance of my services by the Director-General of the Army Medical Department. I have been frequently urged to place myself in official communication on the subject, but I should have preferred it to have originated from any one but myself. As this has not occurred, I have taken the liberty of introducing the subject to your notice. It is possible that it may interest you, and that the facts as well as the suggestions are new to you. I shall be most happy to forward to you further reports of these cases. Some of them are in print (illustrated); models of these were furnished to the Museum at Fort Pitt, at the request of Dr Williamson, and are likewise in the Museum of the College of Dentists.

"I have the honour to remain your obedient servant,

"JNO. COX SMITH,
"Dentist to the Rochester, Chatham, and Stroud Dispensary, and Dentist to the Kent County Ophthalmic Hospital, Maidstone.

"To Dr Gibson, C.B., Director-General,
Army Medical Department."

"Army Medical Department, Nov. 30, 1860.

"SIR,—In acknowledging your communication of the 21st inst., with reference to cases which have been treated by you from the Military Hospital at Fort Pitt, I have the honour to express to you my deep sense of the kindness you have shown to the disabled soldiers in the many instances to which you have called my attention, involving severe injuries of the jaw and loss of teeth; and I beg to inform you that I have forwarded your letter to the Principal Medical Officer at Chatham, who has been requested to furnish a report on the subject.

"I have the honour to be your most obedient, humble servant,

"J. B. GIBSON, Director-General.

"J. Cox Smith, Esq., Dentist, Chatham."

"I received a visit from one of the Medical Staff at Fort Pitt, on the subject of my letter, and for the purpose of ascertaining my own wishes. I was informed that my suggestions in the letter to the Director-General were considered perfectly proper. I then stated that I was not actuated by any pecuniary motive in thus bringing the matter forward; that I considered that I should but ill-represent my Profession if I were unable to attend to a few cases of this nature without seeking payment for them. But that as for several years I had acted as Dentist to the hospital, I should wish to be acknowledged as such, and feel myself at liberty to use the designation without subjecting myself to the charge of unauthorised assumption. Arrangements of any kind, that in the opinion of the proper authorities would place me in this position, would be perfectly satisfactory to myself; but that I was not anxious to continue my services at Fort Pitt without being officially recognised.

"It was then arranged that a letter should be written by the Director-General to the Principal Medical Officer at Fort Pitt, an official copy of which should be sent to me to retain in my possession.

"MEM.—The enclosed copy of letter from Director-General Army Medical Department is forwarded to Mr J. Cox Smith with Dr Hume's compliments. (By order)

"Principal Medical Officer's Office, Fort Pitt, December 22, 1861."

"Army Medical Department, December 20, 1860.

"SIR,—With reference to your memorandum on a letter from Deputy Inspector-General Longmore, relative to the employment of Mr J. Cox Smith, Dentist, at Chatham, I have the honour to request you will be pleased to inform that gentleman from me, in reply to his communication of the 21st ult., that his services will be requested when a case occurs requiring his assistance at Fort Pitt.

"I have the honour to be, Sir,
"Your most obliged humble servant,
"(Signed) J. B. GIBSON, Director-General.
"(A true copy.)
"THOMAS LONGMORE,
"Deputy Inspector-General of Hospitals.
"The Principal Medical Officer, Fort Pitt, Chatham."

TO THE EDITOR OF THE 'DENTAL REVIEW.'

SIR,—At the last conversazione of the College of Dentists, was exhibited a new Porcelain Impression Tray, introduced by Mr Rutterford, and it must be acknowledged that the want of clean-looking trays, not liable to get tarnished, has long been felt. Those made of pewter are very difficult to keep clean, and what with the wax, and the plaster and bruises they get in wear, in a very short time are hardly fit to present to a lady patient. Silver and electro-plated trays not only tarnish very readily, but are much too expensive for the generality of Dentist's use. So we must regard a porcelain tray as a very desirable addition; and were it not that we fear that the breakage would amount to something considerable, they might be regarded as perfect. Dentists' assistants have proverbially been regarded as very careless and the workshop is seldom the most orderly place in the world, so that many instruments much less brittle than china, are found broken daily; and we fear, sadly, the porcelain tray would be more frequently found disabled than fit for service. It is some months since I first suggested the manufacture of glazed iron for this purpose; and now that this description of ware has been so greatly improved—and it is not only made in plain white, but in fancy patterns—I cannot imagine anything more suited to the purpose They would always look clear, cannot be broken, are very light, and certainly not difficult of manufacture. I have thrown out the hint in the hope that one of our enterprising Dental appliance manufacturers may give it their attention. Yours obediently,

32 Great Russell street, Bloomsbury square. FELIX WEISS.

MISCELLANEOUS.

DENTAL HOSPITAL.—Speaking of the establishment of the National Dental Hospital, the 'Dental Register of the West' makes the following remarks:—This movement is based upon a conviction of the fact, that the Profession has made such attainments as will make it eminently valuable to all classes of society; indeed, so much so that none should be without its aid. Society, as a whole, has a right to demand such aid. Such institutions, in addition to being instrumental in the alleviation of human suffering, will be of incalculable advantage for the further development of professional attainments, and especially to those who are seeking knowledge. In the establishment of Dental hospitals our English brethren are in advance of us. It is true, we first established Dental Colleges; but they, too, in London have established an institution of this character, and one, we should think, well calculated to accomplish the object of its institution. They did not stop with this, but immediately set about taking the next very natural step—viz., the establishment of Dental hospitals. We have made but a feeble effort in this direction, in the establishment of Dental infirmaries in connection with our colleges. Only one idea, however, is prominent in these—viz., that of giving instruction to the students, leaving out of view almost entirely the highest good of the patients. They were first instituted avowedly for furnishing means of instruction to students; they are kept open only during the College Session. We think it very desirable that something more than this should be done here, as well as in London. It has been suggested that a Dental department in the regular hospitals might accomplish the desired objects. While it is true that something might be accomplished in this way, it is very evident that the greatest good could not thus be accomplished. In the ordinary hospitals, there are very few patients who are in a condition for Dental treatment. It might be desirable to have a Dentist connected with every general hospital; but then we do not conceive that the aims and objects of a Dental hospital could be efficiently carried out in such institutions. Dental hospitals should be established upon such a basis and plan as would most fully meet the wants of those who are unable to pay the ordinary fees for Dental operations; and at the same time afford facilities for improvement to those seeking attainments in the practical and scientific departments of the Profession.

CHLOROFORM IN DENTISTRY.—In cases of dentists' operations chloroform is much used, and with great safety; it affords very marked relief, though in as a rule, it is not desirable to push the anæsthetic action as far as complete sensibility; deep narcotism is, indeed, to be avoided, as the patientshould be partially conscious, at least as regards the special senses, so as to hear the spoken directions of the operator when he directs the mouth to be opened, the mouth to be washed with water, &c.; such patients will often cry out most terribly, too, especially nervous females, they have the apprehension of pain vividly before them; yet, when asked afterwards, they say they felt nothing, they express the utmost amazement that five or six or ten hideous stumps, old enemies, are all out; but such is the fact. As regards the position of the patient, although, perhaps, not very desirable, yet I have administered chloroform so often to persons sitting upright or partly upright in a dentist's chair, that I believe there is not much risk attending it. Snow had six hundred such cases; if faintness occurs, however, the patient should at once be let down on the floor, or placed in an horizontal position, or carried into the open air. M. Velpeau relates an accident (somewhat of the nature of a dentist's case) that is, suggestive to dentists; he was called to remove an enlarged tonsil, he chose ether as the anæsthetic, the patient became deeply insensible, blood collected in the mouth and throat, the directions to wash the mouth with water were unheeded, the reflex function of the nerves of the part was extinguished, and the patient was suffocated. In such a case as this the operator must trust almost entirely to the will of the patient, as it is now found that probably some deaths have been hastened by catching the tongue in a forceps to draw it out, or hooking the finger into the pharynx; if the respiratory muscles have stopped, the effect of such is of little use. The vascular membrane lining the pulp cavity of a tooth that is painful, is usually intensely sensitive and vascular, though the tooth itself is insensible; here it is desirable to touch the former with a little creosote before extraction, or to allow the patient to wash the mouth first with iced water, or with chloroform and water. It is to be feared that some dentists frighten the patient from having chloroform; they have at their fingers' ends all that has appeared in the journals of the danger of diseased heart, &c.; at the very worst, however, this is not worse than railway accidents. But what should we think of the intellect of a man, dentist or not, who would advise his friends never to enter a railway carriage. A patient should never be frightened, as fear may bring on exactly what is to be avoided. Young patients require less chloroform, or rather they remain longer under it than old patients; they will go off into sleep, too, when released from the agony of an old pain; a fixed stare in such a patient with protrusion of the balls of the eye, with sudden surprise and stoppage of the breath, are always the first signs of danger during the administration,—signs of irritable larynx cough, &c., require additional caution also. It is fortunate, as stated previously, that very complete anæsthesia may exist; but still the special senses of seeing, hearing, &c., remain curiously perfect. Patients, too, as if in pain, especially sensitive ladies, will cry most vehemently as teeth are extracted, but they will say afterwards that they felt no pain whatever, and when the effect of the chloroform has passed off they remember nothing of pain. Muscular rigidity of the masseter and other muscles of the lower jaw is very common in dentist's cases. A piece of wood or a screw is usually inserted between the teeth, and answers every purpose very well. If the patient is desired also to open the jaw, if the narcotism be not too deep, he will be found to assist, at least, in doing so, and there is seldom any difficulty on this head.—DR KIDD ON 'Chloroform.'

NOTICES TO READERS AND CORRESPONDENTS.

All communications intended for insertion in this Journal must be authenticated by the name and address of the writer, not necessarily for publication, but as a guarantee of good faith.

Contributors are requested to be so obliging as to write legibly, and on one side of the paper only.

All communications are requested to be addressed to Mr JOHN W. DAVIES, 54 Princes street, Leicester square, the present Publisher of the Journal.

A. ALABONE is thanked for his communication, but we were unable to insert it for want of space.

HENRY THOMPSON.—The Lectures at the Metropolitan School of Dental Science are continued throughout the winter months, until the end of May. The Lectures at the London School of Dental Surgery only extend over three months.

A. B.—Your communication will not suit our journal. It may be acceptable in another quarter.

A FIRST-YEARS' STUDENT.—We believe that Tomes' Lectures are out of print, and his recent work is not adapted to the wants of the student. Dr Chapin Harris's 'Dental Surgery' is a standard work. Druit's 'Surgeon's Vade Mecum,' and Tanner's 'Practice of Medicine,' are the best books on those subjects, and contain all that is required by the Dental Student.

RUS.—The Examiners of the College of Surgeons are arbitrarily appointed by the Council, and the Members of the Dental Profession have no voice in the matter. The present Examiners are all Members of the College, but Mr Tomes only became so the year before he was appointed to the office of Examiner. "Coming events cast their shadows before!"

ALFRED JOHNSON.—The National Dental Hospital will be opened in November. Pupils will be admitted upon such terms as will be decided upon by the Committee of Management.

BOOKS RECEIVED IN EXCHANGE.

The Dental Cosmos for October.
The Dental Register of the West.
L'Art Dentaire for October.
The Pharmaceutical Journal for October.
The Revue Odontotechnique for February.

THE

DENTAL REVIEW.

DECEMBER, 1861.

THE NATURAL HISTORY OF THE HUMAN TEETH.

By JOHN HUNTER, F.R.S.

EDITED BY

FRANCIS C. WEBB, M.D. Edin., F.L.S., F.S.A.,

Member of the Royal College of Physicians of London; Physician to the Great Northern Hospital, &c.

(Continued from page 489.)

OF THE BICUSPIDES.

Immediately behind the *Cuspidati*, in each Jaw, stand two Teeth, commonly called the first and second Grinders, but which, for reasons hinted at above, I shall suppose to constitute a particular class, and call them *Bicuspides.* (*j*)

These (viz. the fourth and fifth Tooth from the symphysis of the Jaw) resemble each other so nearly, that a description of the first will serve for both. The first indeed is frequently the smallest, and has rather the longest fang, having somewhat more of the shape of the *Cuspidatus* than the second.

The body of this Tooth is flattened laterally, answering to the flat side of the fang. It terminates in two points, viz. one external and one internal. The external is the longest and thickest; so that on looking into the mouth from without, this point only can be seen, and the Tooth has very much the appearance of a *Cuspidatus;* especially the first of these Teeth. The internal point is the least, and indeed sometimes so very small, that the Tooth has the greatest resemblance to a *Cuspi-*

(*j*) [The premolars (*bicuspides* in human anatomy) are those teeth which succeed the deciduous molars (*Vide* Note, b. p. 340). For the sake of convenience of description, the principal variations in the form and number of the premolar series, in the different orders of Mammalia, will be noticed in connection with the comparative anatomy of the true molars.]

datus in any view. (*k*) At the union of the points the Tooth is thickest, and thence it loses in thickness, from side to side, to the extremity of the fang; so that the fang continues pretty broad to the point, and is often forked there. (*l*) All the Teeth hitherto described often have their points bent, and more particularly the *Cuspidati.*

The Enamel passes somewhat farther down externally and upon the inside, than laterally; but this difference is not so considerable as in the *Incisores*, and *Cuspidati;* in some indeed it terminates equally all round the Tooth. They stand almost

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(*k*) [From the greater size of the outer cusps, as compared with the inner of both premolar teeth, the outer curve formed by the premolar part of the dental arch is greater than the inner. In the upper bicuspid, the outer and larger cusp is divided from the inner by a deep, straight fissure or groove; in the lower bicuspid, this fissure describes a curve concave towards the outer cusp. In some cases the curved groove in the lower premolar is crossed by a ridge, which extends from the outer to the inner cusp. The inner cusp in the lower tooth is less developed than the same tubercle in the upper. (1)]

(*l*) [The fang of the lower premolar is single, long, sub-compressed, and conical. In the upper jaw, although at first sight the fang of the premolar might be supposed to be single, an examination of the pulp cavity, which is bifurcated, shows that it really consists of two connate fangs, an internal and external, which generally, by a groove on the surface and by a bifid extremity, evince a tendency to separation. (2) More rarely, the external and internal fangs are completely separated; according to Mr Nasmyth, this conformation is generally confined to the anterior upper bicuspid. (3) In some rare and exceptional instances the Editor has seen the external division of the root of the upper bicuspid again divided into an anterior and posterior fang, making an implantation by three fangs—the normal implantation of these teeth in the Anthropoid Apes. Mr Tomes, in his Lectures on Dental Physiology and Surgery, notices this conformation, and instances a Chinese skull in which the upper anterior bicuspid has an implantation by three fangs, like a molar. (4) Such an anomaly, however, is peculiar to no race of Man. The Editor has noticed it in the cranium of a Frenchman, in a North American aboriginal, and in two crania of slaves from the banks of the Mississippi. He has also seen the division indicated by a deep groove on the external fang of an upper premolar in the cranium of a Hindoo. In all the instances, save one, which have fallen under his notice, it was the anterior upper premolar which displayed this complex implantation. In the exceptional case, the left posterior upper premolar was implanted by three fangs, the right by two.

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(1) Owen, op. cit.

(2) Ibid.

(3) Nasmyth, Researches on the Teeth, p. 68.

(4) Tomes, Lectures on Dental Physiology and Surgery, p. 13.

perpendicularly, but seem to be a little turned inwards, especially the last of them.

In the Upper-Jaw they are rather thicker than in the Lower, and are turned a very little forwards and outwards. The first in the Upper-Jaw falls between the two in the Lower. The second falls between the second and the first Grinder: and both project over those of the Lower-Jaw, but less than the *Incisores* and *Cuspidati.* (*m*)

The *Bicuspides*, and especially the second of them, in both Jaws, are oftener naturally wanting than any of the Teeth, except the *Dentes Sapientiæ;* thence we might conjecture that they are less useful; and this conjecture appears less improbable, when we consider, that in their use they are of a middle nature between Cutters and Grinders; and that in most animals, so far as I have observed, there is a vacant space between the Cutters and Grinders. (*n*) I have also seen a Jaw in which the first *Bicuspis* was of the same shape and size as a Grinder, and projected, for want of room, between the *Cuspidatus* and second *Bicuspis.* These and the Grinders alter very little in shape on their grinding surfaces by use; their points only wear down, and become obtuse.

(*m*) [The premolars present no variation in configuration in the different varieties of Man. Like the molars, as a rule, they are of large size in the Melanian races, especially in the Australian; although, even among these, exceptions occur in which these teeth are not of greater dimensions than in some individuals of other races.

(*n*) In the large majority of cases in which the second bicuspid (*p.* 4) appears to be absent, it is prevented coming into place by the retention of the second deciduous molar to a late period of life. The retention of the first deciduous molar may, in like manner, prevent the appearance of the first bicuspid. It would appear, however, that this is more rare. Mr Tomes states that, according to his experience, the lateral incisors are more frequently absent than any other teeth, with the exception of the wisdom. (1) Comparative anatomy does not warrant us in seeking any analogy between the occasional absence of the second bicuspis in Man, and the existence of a *diastema* between the grinders and cutters in the lower animals, for the second bicuspis is the homologue of the tooth (*p.* 4), which of all the premolar series is most constant in placental diphyodonts. The premolars in the higher Mammalian dentition form part of the same series with the molars, in front of which is the *diastema*, separating them from the canines and incisors; and reduction in the number of premolars always takes place by the suppression of one or more of the anterior teeth.

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(1) Tomes's System of Dental Surgery, p. 221.

(To be continued.)

ORIGINAL COMMUNICATIONS.

ON THE ACTION OF THE DECIDUOUS TEETH UPON THOSE OF THE PERMANENT SET.

A PAPER READ AT THE MONTHLY MEETING OF THE COLLEGE OF DENTISTS, NOVEMBER 5, 1861.

BY FIRMAN COAR, D.D.S.,
Member of the Pennsylvanian Association of Dental Surgeons.

IT is no ordinary honour to be permitted to read a paper before such a respectable body as this; and, be assured, that as a stranger amongst you, I fully appreciate the favour accorded me to offer a few remarks upon a subject pertaining to that Profession, which is here represented.

It is gratifying for us to feel that, through a knowledge of Dentistry, so much has been done towards relieving and mitigating some of the most serious misfortunes that befall our fellow-beings; and it must also be a source of great pleasure for us to observe, that in proportion as our Profession has required that its members should qualify themselves for a faithful discharge of their duties, so has it increased in importance and respectability. We now have good reasons to believe that, e'er long, Dentistry will have acquired the position of an *independent Profession*, and as such, will not only command the confidence and respect of the other established professions, but also the grateful acknowledgement of an enlightened people. It is my purpose to confine this paper to some plain remarks upon the "Deciduous Teeth." Every practitioner has had frequent occasion to observe the evils consequent upon the early decay of these teeth. Experience has convinced me that the most deleterious effects result from inattention to the teeth of young children; the most serious of which, is the direct tendency to promote the disarrangement and destruction of the permanent teeth. This is easily made clear, for it is well known that when caries attacks the temporary teeth, the process of destruction is exceedingly rapid; in fact, it is often found, that the crowns of the deciduous molars are entirely obliterated from this cause, even before the eruption of the first permanent molar. In England this evil may not be so wide spread as upon the Continent; but in Germany and Russia, full two thirds of the deciduous molar teeth are in an advanced stage of decay, prior to the eruption of the first permanent molar.

Now, what are the probable consequences resulting to this new tooth under such circumstances? Experience proves, and it is very obvious, that it is quite impossible to keep this tooth clean so long as the adjoining carious teeth remain in the mouth; and it may be supposed that, like them, it will fall a prey to the same destroying agency. That this result may be apprehended, it is only necessary to consider that caries of the teeth proceeds almost entirely from external causes; that it is the action of foreign elements upon the mineral parts of the tooth, which is productive of so much destruction among these organs, and that the medium through which the solvent elements act, may be any foreign body lying in connection with the tooth. This may consist of portions of food, tartar, or the carious parts of teeth. If, then, the deciduous teeth are in a carious condition, the inability to keep the mouth clean affords every facility for the action of such fluids as may be injurious to the teeth; that there are fluids of a decomposing nature in the mouth, the condition of these first teeth afford us abundant evidence; and it can only be supposed that their action will be continued to such organs as are similarly constituted as those already affected. That this is the case, facts will fully substantiate; for it will be found, that where the entire eruption of the first permanent molar has taken place while the deciduous molars are still remaining in a carious state in the jaw, this permanent tooth will almost universally become also attacked by caries, and it will often become necessary to extract it, even before the temporary molars have fallen out. This is not the extent of the disastrous consequences, for the early loss of the bicuspids may be traced in a great measure to the same cause.

Should the development of the first permanent bicuspid take place, and the second deciduous molar be still remaining in a carious state, we find that the delicate coating of enamel which covers the approximal surfaces of these teeth, is always more or less injured by being in contact with the diseased tooth. It is not presumed that any contagion is imparted to the new tooth, but by its being contiguous to a diseased one, it is acted upon chemically by decomposing substances held in connection with it by its affected neighbour. Sometimes this amounts only to a slight softening of the enamel, which at the time may be almost imperceptible, but which is sure to develope itself later into actual caries. It very frequently occurs, however, that we find the tooth decayed to such an extent as to require filling even before the entire eruption of the second bicuspid. I suppose that this last fact has come under the observation of nearly every practitioner.

Should extraction of the deciduous teeth be resorted to in this case, in order that no direct injury might be sustained by the permanent teeth, there is great danger of encountering another very serious difficulty in future; for in nearly every case, where such a course is adopted, the growth of the jaw will be found more or less impeded; when, therefore, the time arrives for the development of the second bicuspid and cuspid, it will be seen that they deviate somewhat from the regular arch; and sometimes to such an extent, as to require the extraction of a permanent tooth before they can be brought into the proper position.

I believe that the experience of most practitioners has taught them, that one of the great causes of the irregularities which are so often met with, is the early extraction of the milk teeth. On the other hand, if the teeth are left in a carious state in the mouth, it is seen that most deleterious consequences follow.

Here, then, we have a patient at the age of eight to eleven years, whose teeth are in such a situation, that it is almost impossibile to retain the arch of the permanent teeth in an unbroken state; and it becomes the duty of our Profession to devise and employ such means as will guard against these misfortunes. Much may be done towards obtaining this desirable result by bestowing especial care upon the deciduous teeth. These teeth should be as carefully examined, and as thoroughly treated as those of an adult. Upon the appearance of the first incisors, the child should be accustomed to having them regularly brushed, and if this is diligently attended to, it will in nearly every case prevent the deposit of that "green tartar" which is so destructive to these teeth. The child also becomes habituated to the use of the brush, and learns to regard it as one of his daily necessities. When the molars are fully developed they should be examined with care, and if any cavities are found in them, the caries should be entirely removed, and the cavities completely filled either with "gold or tin foil," an operation which will have the effect of arresting any further decay in those parts. From this time on the teeth should be examined at intervals of five or six months, and on each occasion treated with as much care as if they were the permanent teeth. Let this course be faithfully pursued, and we shall find that in nearly every case this first set of teeth will be preserved in a sound and healthy condition, until they fall out by the natural absorption of their roots, previous to the eruption of the second teeth. Should this end be accomplished, most important results will follow; the jaws will be expanded to their natural proportions, and much of that irregularity will be prevented, which is now so often met with in the permanent teeth; in addition to this, the delicate enamel which protects those organs on their first appearance, will not be subjected to the deleterious influences, that adjoining carious teeth would be productive of.

By this mode of proceeding, an important moral effect has at the same time been produced on the mind of the young patient; his experience has shown him that the Dentist is not a person whose name is only to be associated with all the terrors of "tooth-extraction;" and his confidence is established in the beneficial effect to be derived from a proper regard for the advice of his Dentist; in after life he will in no case neglect to seek that advice on all necessary occasions.

Parents are undoubtedly much to blame for the indifference with which they regard their children's teeth; for, unfortunately, the Dentist is rarely consulted until pain in some of those organs drives the sufferer to him for relief; but, I believe, that had the

Profession in general attached the importance to this subject which it is worthy of, our patients would have regarded it of greater consequence.

I am firmly convinced that if Dentists would seriously consider the benefits to be derived from an early attention to the deciduous teeth, and on all suitable occasions endeavour to impress the importance of their preservation upon the minds of those who seek their advice, that in a very few years most advantageous results would accrue therefrom, and a generation would grow up with clean mouths, and comparatively sound teeth ; and there would then be far less occasion to replace those important organs with artificial structures. That these are objects worthy of being accomplished must be clear to the mind of every professional man ; for when we have arrived at that point, in which to a great extent the preservation of the permanent teeth shall be effected, by the care which has been bestowed upon the first teeth, our Profession will have established a claim to still higher honours ; for we are assured that the great end of Dentistry is not so much to devise the means of replacing the teeth as it is to establish rules for their preservation.

I am not aware if in England so much depends upon the preservation of the temporary teeth, but more than five years experience upon the Continent has convinced me that a vast amount of the distress occasioned by the early decay of both the deciduous and permanent teeth, which one observes there, is traceable alone to the almost universal custom of neglecting entirely the first teeth.

DISEASES OF THE DENTAL PERIOSTEUM:

A Course of Lectures delivered at the College of Dentists of England, Session 1860-61,

By R. T. Hulme, M.R.C.S., F.L.S.

Lecture III.

Mr President and Gentlemen,—Having spoken in my previous lectures of the course which inflammation pursues when it attacks the periosteum of the tooth, and of the effects which certain states of the constitution and some poisons are capable of producing in this membrane, it remains for me to describe those morbid growths which occasionally originate in the periosteum of the tooth, and that excessive formation of the cement which occurs most frequently in old teeth, and then becomes a source of disease.

In speaking of the structure of this periosteal membrane, I mentioned that it consisted of a fibrous tissue containing a number of peculiar cells, known as fibroplastic and myeloid cells, cytoblastion, and a small number of fat globules; in addition to these structures the periosteum, as we have seen, is also plentifully supplied with blood-vessels and nerves. Under a deranged or morbid action in the membrane, disease may arise in which all these elementary tissues are more or less involved, but in which some one particular element is found to prevail, and thus becomes characteristic of the morbid growth. The structure which most frequently takes upon itself this increased action, is the fibro-plastic element, or that which is so commonly found to become excessively developed in other parts of the body, and which is often spoken of under the title of connective tissue. Sometimes these formations consist of simple hypertrophy of the periosteal membrane, and constitute those growths which come under the head of fibrous tumours; while, at other times, a number of stellate or fusiform nuclei are developed, which appear to represent an early stage in the formation of the fibrous or basement structure of the periosteum, and form the fibro-plastic group of our table. Thus, out of the eighteen cases recorded by Magitot, and whose structural peculiarities were determined by the well-known French microscopist, M. Robin, no less than eight belonged to this division.

The epithelial element, consisting of cells which are generally of a large size, and contain three or more nuclei, is that which forms the second largest number of these tumours, according to the statistical returns of Magitot.

Another class of tumours is composed of the myeloid cells. This series is exceedingly interesting, and of considerable importance, in consequence of the larger number of the tumours about the jaws and face, which require the intervention of the surgeon, consisting essentially of similar microscopic elements. These tumours, as they are developed in the maxillary bones, have greatly the appearance of malignant growths; but M. Nélaton has conclusively shown that they are of a non-malignant character; and that when the disease is fully extirpated by operation, it is not liable to return.

The fifth group is composed of tumours, which are made up of cytoblastions. M. Magitot has only recorded a single instance belonging to each of the last two groups; nor have I myself been able to refer any of the tumours that I have examined, to either of these groups, that is to say, I have not met with tumours of the periosteum, which I could say were principally composed of either of these elements. I have, however, on one or two occasions encountered a large number of these peculiar cells in certain parts of the tumour.

The sixth and last group has not been recognised by M. Magitot, nor have I myself as yet met with that kind of tumour, which comes under the title of vascular. The only account of a growth of this kind that I am acquainted with is given by Mr Salter in the *Transactions of the Pathological Society* for 1854.

The tumour had existed in the mouth about twelve months before its removal. When first noticed, it was the size of a pea, and situated on the outer left side of the upper jaw, near the edge of the gum. It slowly increased for eight or ten months without producing any inconvenience: then, for the first time, it gave trouble by its oft-repeated bleeding, when slightly touched or even spontaneously. This tendency to hæmorrhage rapidly and considerably increased, and for some few weeks before its removal, it bled during the night, in large quantities, and the patient was frequently awoke by the blood trickling into the glottis, the person and the pillow being saturated with blood. The tumour, before its removal, was of the size and colour of a morella cherry, deeply and irregularly lobulated, and attached close to the edge of the gum by a pedicle. The tooth to which the tumour was attached was loose and tender; and, from the absorption of the alveolar process, and the receding of the gum, the neck, and about half the fang were exposed and naked in the mouth.

Upon a microscopic examination of the tumour, after the removal of the tooth, it was found to consist of a congeries of numerous blood-vessels, and connective tissue among which there were no cells. The outer surface was covered with mucous membrane. On the convexities of the lobules were numerous papillæ, like those of the gum, covered by a dense cuticular epithelium. In the fissures between the lobules, the mucous membrane was soft, and the epithelium globular.

The symptoms which accompany these tumours, are very similar to those which are met with in chronic periostitis. The tooth becomes tender and somewhat loose in the socket, and where the disease has lasted some time, it is misplaced; the gum opposite the tumour is swollen, of a deep-red colour, and separated from the neck of the tooth. These are the symptoms which meet the eye of the dentist; as regards the sensational symptoms, the patient will tell you that he first noticed a dull heavy pain in the tooth, that it was slight, and that he became somewhat accustomed to it, but that after a while he had an attack of acute pain which lasted for some days, and then subsided, the tooth returning to its usual condition; and that he has been accustomed to these exacerbations at certain intervals for some months. In the latter stages of the disease, it would also seem as if the tumours themselves were liable to attacks of inflammation, terminating in the formation of pus; when this takes place, the tooth becomes surrounded by pus, which passes away as a constant discharge from the neck of the tooth.

"The causes which give rise to tumours of the dental periosteum," says M. Magitot * "are involved in as much obscurity as the production of tumours in general." In the eighteen cases

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* *Opus cit, p.* 12. See also translation, in DENTAL REVIEW, vol. 2, p. 332, 1860.

recorded by this gentleman, he states that they all occurred in persons of good constitutions, and who had never had any tumours form on any other parts of their bodies. Several, however, of the patients who consulted him on account of a tooth affected with a tumour, appeared to have suffered with other teeth in a similar manner. Thus, four of his cases showed the possibility of the development of several tumours in succession in the same individual, not as the writer remarks, in the same place, and by spreading to the contiguous tissues, but in the neighbourhood and on the periosteum of other teeth; he adds, that he had not observed the development of tumours on contiguous teeth, and that the succession seemed to have taken place at certain distances, either in teeth situated on the opposite jaw, or on the opposite side of the same jaw. The anatomical condition of the teeth, each covered with its respective periosteum, and each inclosed in a separate alveolus, is not being such as to favour the spreading of a tumour of the periosteum of one to the periosteum of the neighbouring teeth.

M. Magitot is farther of opinion that the various affections to which the tooth is liable, do not appear to exercise any marked influence on the development of these tumours. Thus, caries for example, the commonest disease to which the tooth is liable, appears to him to have nothing to do with it. The cases which he had collected, referring principally to teeth which were not affected with caries, and in only a small number of cases in which this disease accompanied a tumour, was he able to trace any connection between the two diseases. Out of eighteen cases of periosteal tumours, only eight of the teeth were carious; and in three of them the cavities were quite superficial; they had no communication with the pulp, and could not, therefore, give rise to any disturbance. The five remaining teeth were, on the contrary, deeply decayed, but their pulps having been entirely destroyed, either as the result of gangrene or of a purulent discharge, any disturbance was equally impossible. The latter, however, M. Magitot admits might have been the subject of chronic periostitis, a disease which most frequently succeeds advanced caries, and which, perhaps, might be of such a nature as to cause the formation of a tumour. But, he says, only five out of eighteen teeth were in these conditions, and that number is relatively too small to establish any definite conclusion as to the cause of the disease. No disease of the tooth, therefore, appears to influence the development of the periosteal tumour.

My own experience does not entirely accord with that of the able writer whose remarks I have just quoted. The cases in which I have noticed these tumours may be arranged under two series. The one, and that which I believe contains the greatest number, although I must admit that I cannot speak positively on the subject, consist of teeth which have been so far decayed as to have affected the dental pulp, and have given rise to inflammation of the dental periosteum. The other series consists of old teeth, in which the fangs are partially exposed from absoption of the gum and alveolar processes, and in which a chronic inflammation of the periosteum, of a very slow and subdued character, had existed for some time. I cannot help, therefore, regarding a chronic inflammation combined with a peculiar diathesis in the patient, as the source of these tumours in the dental periosteum. What we know of the pathology of this membrane, seems to me to point to such an origin. In the first stage of an inflammatory attack, the periosteum becomes more vascular and thickened ; if the inflammation increases, it then gives rise to the formation of pus, but if it remains as it were stationary in the incipient state, which may be regarded as a condition of hyperœmia or plethora, under which the elementary tissues take on an undue development, then it gives rise to one or other of these forms of tumour which have been previously described.

Generally speaking, the injurious effects of these tumours is limited to the part, and does not, as M. Magitot says, seem inclined to spread either to the periosteum of jaw or to that of the neighbouring teeth. The history of some cases would, however, lead one to doubt whether this is invariably the case. Some time back, a patient came to me with a large fibrous tumour, which projected into the mouth on the left side of the lower jaw, extending from behind the incisor teeth to about the situation of the second molar of the same side. The tumour in the process of growth had succeeded in removing the bicuspid teeth from their sockets, and carrying them forward as it became gradually developed, so that at the time of her visit to me, the biscuspids were placed directly behind the lateral incisor and canine of the same side. I removed one of these teeth ; the operation was followed by a tolerable profuse hæmorrhage, which, however, ceased in a short time from the application of cold water. Upon examining the tumour by means of the microscope, I found it was a simple fibrous tumour of a non-malignant character, but which, if left to pursue its course, would inevitably destroy the patient. I therefore sent the patient to my colleague, Mr Spencer Wells, who skilfully and successfully removed the tumour, including all that portion of the horizontal ramus of the jaw, when the patient gradually recovered her health and was enabled to return to her occupation, which was that of a dressmaker. Now, the point in the history of the case which interests us at the present moment, arises from the circumstance that immediately in the centre and on the surface of the tumour, were the remains of two stumps. These stumps which must have been the remains of the fangs of the first or second molar teeth, would seem, in all probability, to have been the exciting cause of the disease, and to have been the centre from which it had spread and involved the neighbouring structures.

M. Nélaton, in his work entitled *Une Nouvelle espece de Tumeurs benignes des os ou Tumeurs a Myéloplaxes*, p. 79, relates the following case :

Victorine F., aged twenty-seven, of a good constitution, entered the Hôpital Lourcine on account of a number of perforations in the velum palati and ulcerations in the nasal fossæ.

Two years previously, the patient had noticed a small tumour about the size of a pea on the inner border of the gum, opposite the first right upper bicuspis, of which only the fangs were remaining. The tumour, of an indolent character, was directed towards the opposite side of the mouth, and was not connected with the fangs. In six months the tumour attained its present size, but the patient could still masticate on that side, only the gum bled easily, and after every meal the tumour appeared to undergo a temporary enlargement. The medical men who were consulted, believing it to be a vascular tumour, refrained from operating, and only touched its surface frequently with nitrate of silver, which produced no benefit.

At the time of the patient's entering the hospital, the disease acquired the size of a small nut, and occupied all the interval between the canine and the second bicuspis ; it did not descend below the level of the other teeth, but projected into the cavity of the mouth, and greatly impeded the movements of the tongue. The fangs of the first bicuspis, consisting of the extremities of two roots, were implanted in the centre of the mass to which they were adherent. A few days previously the tumour, which had hitherto been indolent, gave rise to shooting pains ; moving the tumour was not painful, but the least disturbance of the remains of the roots produced very acute sensations.

The tumour was removed by M. Morel Lavallée, and was followed by a very profuse hæmorrhage, and from the bottom of the alveolus there issued a stream of arterial blood of the size of a common probe. The application of the perchloride of iron failed in arresting the hæmorrhage, which was only controlled by the application of a plug of softened wax.

The tumour consisted principally of myeloid cells, and the fangs of the first bicuspis were adherent to it by means of their periosteum. This adhesion, M. Nélaton remarks, must have taken place subsequently to the formation of the tumour. It would, however, appear extremely probable that the presence of these stumps were a source of irritation, and, in fact, the cause of the formation of the tumour.

These circumstances should be borne in mind when considering the treatment of teeth suspected of having a tumour attached to their fangs. In all cases the only effectual remedy consists in removing the tooth, and when this is done, it is almost invariably followed by permanent relief, although the part may remain tender and somewhat painful for some time after the extraction of the tooth. If the patient will not consent to the operation, then the only alternative is to relieve any inflammation which may be present by the application of a leech to the gum opposite the diseased tooth, in addition to which the use of anodyne and soothing gargles may help to allay the pain and irritation consequent upon one of those paroxysms which mark the progress of the disease. When the health of the patient has become affected, and sympathetic fever, with loss of sleep, and other concomitant symptoms, have been set up from the presence of one of these teeth, it is the duty of the medical attendant to insist upon the removal of the tooth; but, even when this has been done, tonics, and other general treatment will be necessary in order to restore the health of the patient.

I know of no certain means by which it is possible to distinguish between one of the exacerbations which occur in chronic periostitis, and those which accompany the formation of a tumour when the tooth is decayed; nor do I know that this is in any way material, since in either case extraction would be the only efficient remedy.

(To be continued.)

THE DENTAL REVIEW.

LONDON, DECEMBER, 1861.

The opening of the National Dental Hospital marks another and most important feature of the independent professional movement. We may consider now, in fact, that the organisation of that movement is to a large extent completed. For practical purposes, everything that could be asked is obtained, and the principle once brought into action, all else in the matters of improvement and expansion, become light, easy, and even pleasant tasks. In spite of an almost overwhelming opposition, in spite of every method which an opposition at once powerful, unscrupulous, and, we must say the word, vulgar, could do; the independent Dentists have won their way, and made for their Profession an admirable organisation, in a space of time much shorter than is common in this country, for the inauguration of any important reform.

The results achieved show simply and forcibly to our minds the benefits of freedom and open action, and the advantages which accrue, almost invariably, from a certain amount of opposition. Had the body of gentlemen to whom we have just referred, and to whose untiring labours, courage, and skill, the Dentists of England are so much indebted, met with no opponents; had all their course been on an unruffled current; had they been allowed to carry out their designs without a word of insult from foes, or of good cheer from friends, we doubt whether they would ever have performed that which they have performed, or seen realised by this time that which we now see. Things and events coming slowly upon us, strikes us with retreating force; he who looks on a friend to-day, sick, and at death's door, and watches him through the stages of recovery to perfect health, hardly knows the steps by which the improvement has been marked; but another one, seeing the sick man at his extremities of disease and of health, is astounded at the contrast. So it is with us in reference to the position of the Dental Profession from that period, extending over a very few years, when Dentistry was in this country in helpless hopelessness, to the present when it stands out really a healthy organism; young, truly, in years; childish, perhaps, in some of its acts, and wayward, also, but still a recognisable fraternity and one which may be named without fear, and claimed without embarrassment. Those of us who have noted the slow process of the reform which has been going on are less able to appreciate its full force and character; while others, who have been, during the whole period, inattentive to the progress, or who have been removed from it, look on the changes that have occurred with absolute and unconcealed surprise. It is most natural that it should be a subject of wonder to the unobservant; for that which has been done is without any boasting a series of great facts. An institution has been founded for the common welfare of the professional body: it has been devised in such manner that its government is independent, and its privileges equal; it is so constructed that without offence it becomes a school for those who, by previous circumstances, have not been able to avail themselves of a scientific education in the full meaning of that word, and it has already become a fair bond of union, and a centre to which the independent men in Dentistry instinctively cling, and from which there is now, fortunately, no probability of their being wrested. After this there has originated a good practical school for the younger members of the Profession, where steadily, and even rapidly, there is growing up a well-educated and industrious class, ready, when the time comes, to fill up the ranks, to make the independent section stronger, and to invigorate it by the infusion of new blood and advancing thought. Lastly, and to crown the whole, we have established for us a hospital for the practical instruction of our youth, and for bringing the benefits of knowledge, with all its improvements, not only to the relief of our poorer brethren, but to the interests of our science altogether, and of our brethren everywhere, of all grades and opinions. More than these practical advantages we cannot require.

As we lay down the pen, the table of days and months before us, reminds us that again we are closing our year, and writing the final notice of another volume. We hereupon once more, thank, our friends for their unwavering support, and as we wish them every success and happiness, call on them to put before all those whom they may know, and who stand in the large majority of outsiders, the true position of the independent section of the Profession at the close of this year. For this position they may well claim reason for congratulation, and on it proclaim an increasing confidence and security. There have been years when for a man to link himself with the College of Dentists was for him to exhibit qualities of endurance or courage not pertaining to all. Those years are gone by, and the College, by deserved reversion of fate, instead of being dependent on individual effort for protection and support, is now the natural support and protector of every man who enters into its union with earnestness, faith, and goodwill.

SELECTED ARTICLES.

DENTITION AND ITS DERANGEMENTS.

A Course of Lectures delivered at the New York Medical College and Charity Hospital (Session 1860-61.)

By A. Jacobi, M.D., Prof. of Infantile Pathology and Therapeutics.

(From the 'American Medical Times.')

(Continued from page 506.)

Lecture VI.

No part of the infantile organism is more exposed to injurious influences than the mucous membrane of the mouth, nor is there any which is more frequently observed to suffer. Traumatic injuries are not frequent, except those sometimes produced by sharp margins of teeth irregularly shaped; the more frequent affections are those resulting either from chemical influences, or from an excessive degree of temperature. The mucous membrane of the mouth is very irritable, being accustomed only to amniotic liquor in fœtal life, and to milk in the early stage of extra-uterine existence. Every change in the diet, therefore, the bad quality of the maternal or artificial nipples, the use of candy, sucking bags, or alcoholic beverages, coffee, or stimulants of whatever kind, will act as irritants, producing hyperæmia or inflammation in a more or less severe form It is by no means common to observe very severe forms of stomatitis after all such preceding causes; on the contrary, the large majority of cases, including those depending on primary acute catarrh of the stomach, and the raising of a large quantity of gastric acid, so frequent in infantile age, are very mild, Nor are some of the most severe forms of stomatitis in adults often found in early age. Thus it is a peculiar fact that the influence of the external and internal use of mercury has little influence on the mucous membrane of the mouth, or the salivary glands, in infantile life. Whatever the consequences of the administration of mercurial preparations may be, salivation, or even a mild form of erythematous stomatitis, is seldom observed; in a large number of adult patients there will perhaps none be found who will not suffer from a certain amount of mercury, but of infants and children of even more advanced age, those who show mercurial symptoms are exceptions to the rule.

There are a number of indirect influences also observed to produce the common, or erythematous form of stomatitis. It will often be seen in dependence on, or in connection with traumatic injuries of the face, erysipelas, and hyperæmia and inflammation of the pharynx. It is further seen under the influence of many dyscrasic processes, as it is a very common symptom attending scarlatina, variola, morbilli, syphilis, and typhoid fever. It is frequently, as its causes will often continue to return, or be replaced by others, of long duration and obstinacy, like the pharyngeal hyperæmia and swelling in adults, and very generally proves a serious difficulty, although unattended by severe fever or deep-seated anatomical disorganisation of any particular organ. Injection, swelling, high temperature, and slightly-reddened colour of the mucous membrane, copious or suppressed secretion, and pain on being touched, are the usual symptoms of the common form of erythematous stomatitis.

A more severe form is that known by the name of aphthous stomatitis. The superficial layers of the epithelium are not thrown off during the hyperæmic swelling of the mucous membrane, as in erythematous stomatatis, but a real and visible change takes place in the anatomical structure of the follicles. There is a circumscribed, punctuated, vascular injection around a follicle, which is gradually infiltrated by exudation, The consecutive swelling increases in proportion, the follicles will burst and exhibit a superficial erosion, or ulceration, and the adjacent mucous membrane will be sympathetically affected. Some of these cases, which are by no means very frequent, look very much like the vesicles of labial herpes, with the only exception that they are less accumulated on a certain small locality; some may be explained by mechanical injuries, some cannot be explained at all. If it were not for those cases occurring in the first two months of life, so well described by Beduar, aphthous inflammation of the mouth would be a very rare disease; at all events, the first stage will seldom come under observation, and usually the second stage, in which the vesicles are fully developed, is brought under your notice.

That dentition, that is, the protrusion of teeth through the gums, can have nothing to do with this form of stomatitis, is manifest from the fact that it occurs mostly in the earliest period where teeth protrude in but very rare and exceptional cases; and that, whenever it is seen in advanced age, no connection, either casual or as to time, can be found between the two. Much less can be said of all the forms of inflammation of the tongue known to be the consequences of caustic substances, combustion, or the poisonous stings of insects; this parenchymatous glossitis has not even been supposed by the most ardent advocates of the universal danger of dentition to be the result of its influence. Nor are the most severe forms of disease of the mouth attributed to dentition, like noma, or scurvy, or diphtheritic inflammation. They are, like the usual forms of stomacace, in which fibrinous exudations are deposed into the superficial layers of the mucous membrane, with an immediate tendency to gangrenous decomposition, well known to be not only the result of a local affection, but more so of a general decomposition of the blood. They are to be considered as the local symptoms of a general disease, the former being entirely subordinate; to say nothing of the age in which they occur by preference. Diphtheritic inflammation will occur in any age, but mostly between the first and third, at all events, rarely before and during the protrusion of the first incisors; scurvy, noma, and stomacace are mostly seen in a somewhat advanced age, between the fourth and tenth years of life. In these, the local affection is something; but the larger amount of the symptoms and danger depending on the general character of the disease.

There is another form of disease, on which nearly the same remarks may be made. Inflammation of the parotid gland, both idiopathic and symptomatic, is not a very uncommon disease, except in the age of dentition. Idiopathic parotitis will usually occur as an epidemic disease, in a similar manner as diseases of the larynx. or pneumonia, will appear as an epidemic, from some causes not perfectly understood, but depending on season and the constitution of the atmosphere; this idiopathic form is seldom seen both in the first year of life and in senile age. The symptomatic form which will usually terminate in suppuration, and is observed in certain epidemics of typhoid fever, cholera, septicobamia, and in some of variola, measles, dysentery, and pneumonia, is very rarely observed in small children; and therefore, among the causes of the above-named diseases, dentition is out of the question, with the exception, perhaps, of an occasional case of slight swelling of the parotid gland, bought on by the contiguity of the mucous membrane. I certainly do not deny the possibility of erythematous stomatitis occurring during the protrusion through abnormal gums, of perhaps an abnormal tooth, in an abnormal direction, and in an abnormally irritable child—one or more of these conditions being together, and therefore admit that a mild parotitis may sometimes occur in a casual connection with dentition; but what I deny, and have attempted to prove by the illustration of the physiological process of dentition, is this, that diseases depending on this process are not the rules, but the exceptions. At all events, not even the slightest erythematous stomatitis must be permitted to go on the plea of dentition, unless there is a local hyperæmia of the gums, the seat of the supposed cause of disease, corresponding with the more general affection. I lay the more stress on this. as I believe I have shown by the numerous causes of stomatitis exhibited to you, that we need not be at a loss to find a cause in any given case, if we are competent to form a differential diagnosis. As long as there is certainty, we had better not resort to hypothesis or conjecture.

If a large number of cases of stomatitis was the result of dentition, why is it that a uniform mode of treatment, if any is resorted to, has not been accepted in these cases, relating to, and dependent on this cause? And why is it, that if any uniform treatment has been accepted, and is recommendable, it is just such as has no connection whatever with dentition? And why further is it, that having no regard whatever to either teeth or gums, it is so uniformly successful? I speak of the chlorates of both potassa and soda, the effect of which in all these cases can no longer be doubted. It has long been a matter of difficulty after it had baen largely introduced into practice, since the times of Hunt, West, Isambert, and others, to decide whether the effect was local or general. But the experiments of Gamberini and Semmola show, that the local effect of chlorate of potassa in mercurial stomatitis is very little, if any; but that the same remedy administered in sugar-coated pills, had a satisfactory effect. My own experience has led me to the same conviction, although, if any local effect is produced, it could be done by the chlorate being transmitted into and secreted by the saliva.

Another of those diseases often enumerated among the consequences of dentition is that sometimes called membranous stomatitis, now better known by the French name of "muguet."

Muguet is an affection which a few facts will prove to have not the slightest connection with dentition. It has been generally observed in new-born infants, or in those but a few weeks old, but it is occasionally met with in more advanced life, even in adults suffering from exhausting and fatal diseases, towards the close of life. It is known by the occurrence of whitish or greyish cream or cheeselike deposits of variable sizes, on the mucous membrane of the upper part of the digestive tract; they will be found on the lips, tongue, cheeks, pharynx, even in the larynx and œsophagus, but never in the stomach. One of its prominent symptoms, as described by adults, is a burning pain in the mouth, corresponding with the local affection; that infants suffer in a similar manner, is proved by their crying on being touched, and by their unwillingness to take the breast or swallow. Where no deposit happens to be seen, the mucous membrane appears injected, dry, and smooth, and but little mucus and saliva is secreted. In perhaps every case diarrhœa has been observed; so regularly indeed, that Vallaix speaks of diarrhœa as one of the common and almost pathognomonic symptoms of muguet. It is, however, probable, that its cause is to be sought for in the impaired digestion, want of mastication, absence of saliva, and affection of the mucous membrane generally.

The enumeration of a number of symptoms does not explain the nature of a morbid process, or a pathological deposit; and nothing but a description of the pultaceous deposits on the mucous membrane will illustrate the morbid change taking place in the mouth. They consist of the mucus of the lining membranes, of old and new epithelial cells, of fat globules, particles of food more or less decomposed, and, finally, of microscopical fungous growths of different size, with sharp outlines and indentations, from which equally composed thalli will originate, to such a number sometimes as to form a network of dendritic parasitic tissue. The fungus was discovered by Robin, and called *oidium albicans*, and has been described by Laycock, Gubler, and a host of other medical writers. It is not known in any form differing from that found in the mouth, and it is probable that it is, as such, contained in the air, and deposited at the entrance of the digestive organs; at least no other opportunity for its occurrence on the mucous membrane of the mouth is possible. It may be transmitted by the atmosphere, or transplanted from one individual to another by direct contact, by the use of the same spoon, &c. But it will not always develope itself with the same readiness, certain conditions being required. They depend on an acid condition of the mucous secretion of the mouth, a certain dryness and injection of the mucous membrane, feebleness of mastication, and easy access of air. It is important to obobserve, that the secretion (as far as it is kept up) of the mucous membrane of the mouth is acid instead of alkaline. It is very frequently found in infants whose mouths are not kept so clean as they ought to be, who are accustomed to sleep while, or immediately after, taking the breast, and retaining milk in their mouth, which soon is decomposed and acid. Muguet is therefore often found in foundling hospitals, where the inmates receive but little care, and uncleanliness is almost the general rule. Where proper cleanliness is strictly enforced, no muguet will appear, because no parasitic fungus is allowed to settle and form a crust of pultaceous matter. Thus, pure water is both the best prophylactic and curative agent; the only thing worth adding is a small quantity of alkaline substance, chlorate of potassa or soda, carbonate of potassa or soda, biborate of soda or chloride of sodium. The mouth of every infant ought to be washed out after each meal, to be certain that no deposit remains on the mucous membrane. Where such has been the case, the local treatment alluded to is perfectly sufficient. The deposit is found in the superficial layers of the epithelium ; it seldom reaches the deeper ones, and scarcely ever implicates the lining membrane itself. Thus cleanliness will remove the affection; the surface sometimes bleeds when the deposit is rubbed off. The addition of sugar, rose-honey, or syrup, to the water (or weak alkaline solution), must be strictly avoided ; these substances will adhere to the lining membrane, and themselves undergo decomposition, and prove a source of new difficulties.

The occurrence of muguet, then, is a mere accident, and has no intrinsic connection either with a distinct morbid process, or with any certain period of early infantile development. It is no more characteristic of any constitutional disease, or general condition of the system, than tinea favosa on any part of the surface, which may be communicated from either man or animal, or scabies. You readily perceive that there is no shadow of a reason to search for any connecting link between the formation and protrusion of teeth and the accidental peculiar deposit on the mucous membrane of the mouth, called muguet, which years ago could be taken for a special kind of exudative stomatitis, but is now well understood.

Before leaving altogether the subject of the diseases and affections of the mouth, I desire to add a few remarks on salivation, that is, on the secretion of more saliva than is required by the ingested food or by involuntary deglutition. The secretion of the salivary glands has too long been regarded as a mere filtrating process, from the fact that in proportion to other secretions, but few solid elements are contained in it. Thus it was considered as a simple exosmotic process, in which the constitution, velocity, and pressure of the blood, nature of the walls of the blood-vessels and the glands, chemical constitution of the glandular cells, and the influence of the nerves were unknown. Ludwig at last has proven, from experiments on the sub-maxillary gland, that the influence of the nerves (facial and trigeminus) acts upon the secretion, without any influence of the pressure under which the blood comes into, and flows in, the gland. The same physiologist, and Czermak at the same time, have observed that the secretion is induced by irritation of the sympathetic fibres of the gland itself, and also of the trunk of the sympathetic nerve on the neck; and what is most wonderful, the latter observer has found, that under certain circumstances the irritation of the sympathetic nerves will sometimes stop the secretion brought on by the irritation of the fifth pair.

The secretion of the salivary glands appears to be under the direct influence of the brain. Bernard produced salivation by irritation of the central end of the dissected lingualis. Direct irritation of the central end of the n. glossopharyngeus has the same effect. The looking at an agreeable dish brings on salivation; so does the thinking of food while hungry, according to the experiments of Frerich, as is also the case with the introduction into the stomach of common salt, or of food. There is superabundant secretion of saliva in ulceration of the stomach, cancer of the stomach, in the premonitory stage of vomiting, in colic from helminthiasis, in certain stages of pregnancy, in hysteria, and in cases of intermittent and typhoid fever, where we are hardly justified to attribute to salivation any importance as a "critical" symptom; in tickling the soft palate, in simple masticating movements of the jaws. Thus you see the possibility of salivation occurring on the introduction into the mouth of irritating substances, in cases of surgical diseases of the mouth, wounds and operations, and of neuralgias in the range of the ramifications of the fifth pair. Thus you perceive, also, that salivation may be produced by the irritation, though slight, of the ramifications of the maxillary nerve, around which the process of the development and protrusion of teeth is going on. At all events, we are not justified in supposing that the contiguity of the mucous membrane, and the transmission of the catarrh of the mouth to the glands, are the only causes of any case of salivation. Even mercury and iodine do not appear to act first on the salivary glands. Iodine is seen in the saliva soon after it has been taken; if direct irritation of the gland was the only cause of salivation, why is it that salivation takes place so late on the administration of iodine? Mercury, too, is soon detected in the saliva, and nevertheless it takes some time before salivation appears. Moreover, the first secretion of salivation in such cases, shows that the mouth is mostly affected. For Lehmann has found, that the secretion is in the beginning thicker and less transparent, and contains more young and old epithelial cells than normal saliva; it contains much fat, little ptyaline, very rarely rhodan-potassium; and its reaction is alkaline. At a later period there are less solid elements, like the saliva secreted on artificial irritation of the nerve; it is still alkaline, contains much fat and mucous corpuscles, but no rhodan-potassium, and sometimes albumen.

Thus it is evident, that the indirect causes of increased secretion of the salivary glands may be very numerous; so numerous, indeed, that sometimes the etiology is very obscure. Thus Moore, in *Dublin Hosp. Gaz.*, August 15, 1858, reports the case of spontaneous salivation in a boy of four years and a half, in whom he was unable to discover any particular cause, although the anomaly lasted for a whole month. There was no tumefaction of glands, no affection of the tongue, no medicines had been taken. The administration of chlorate of potassa and tincture of catechu proved successful.

Whenever, therefore, salivation is produced in a young child, you have to bear in mind all the possible causes of catarrh of the mouth and salivary glands, or of nervous, either peripheric or central, irritation. If you do, you will have less to say on teething and teeth, but will be more of a thinking, physiological physician.

I have noticed already that affections of the mucous membranes in general are very common in early age. One of the most easily affected is that of the pharynx. Catarrh and inflammation of the pharynx, pharyngitis, are said to occur more frequently in adults than in children; and if such was the case, this would be a fact directly in contradiction to any assumption of the prominent influence of teething in this affection. But in late years we have had more opportunity to observe pharyngitis in children than adults, this result being brought about by a number of epidemic diseases principally affecting children, and by the frequent occurrence of stomatitis. The inflammation of the mouth is undoubtedly one of the principal causes of pharyngitis, so much so that a large per centage shows both stomatitis and pharyngitis in the very same individual. Stomatopharyngitis, therefore, is a term not unfrequently met with in literature.

I do not speak here of the chronic intumescence of the pharynx and particularly the tonsils, which is either the result of repeated acute inflammations, or is congenital. It is usually found in fair, pale, "scrofulous," and weakly children, but sometimes in robust ones also, in whom the lymphatic glands generally have a tendency to become enlarged. Their deglutition is but little interfered with, but the respiratory function, formation of voice, and development of thorax suffer much. Such children will snore in their sleep, breathe heavily, lose their breath with every effort, show a bloated and puffed appearance of the face, slightly moving nares, a pale or sometimes bluish complexion, and on inspection, the mucous membrane of their throat appears thickened, and the tonsils greatly enlarged. The use of styptic gargles and the application of local cauteries, is here of little or no use. In a number of cases absorbents will do better, and especially mineral waters containing iodine; but more is effected than by anything else—and surely in a large number of cases, it is the only reliable remedy—by the removal of part or the whole of the tonsils, by means of a simple bougie and Museaux's hook forceps, or by Fahnestock's pharnygotome, or, as it has been called by a barbarous mixture of Latin and Greek, tonsillotome.

Acute pharyngitis has among its prominent symptoms, redness and swelling of the mucous membrane, enlargement of the tonsils, and generally, also, the uvula, which, by being elongated, and playing about the mucous membrane of the posterior and lateral walls of the pharynx, will keep up a constant irritation and give rise to a constant, obstinate, short cough, especially immediately after the child retires. Respiration is always, even in moderate cases, interfered with, and is sometimes very troublesome indeed; deglutition is very painful, and more so with liquid than solid food; hearing is sometimes injured by the consecutive affection of the mucous membrane of the Eustachian tube. Fever is more or less severe according to the severity of the cases; sometimes the circulatory and nervous system are so much affected that severe convulsions will set in. Dyspnœa will be visible on the child's face; the cheeks will be bloated, either livid or pale, eyes injected, tonsils, and sometimes other glands enlarged, and the mucous membrane of the pharynx and tonsils highly injected, of livid velvet-like appearance, and considerably swelled. Sometimes the injection is not at all general, but will appear in spots, exhibiting, as it were, a merely local, or a number of local inflammations. The inflammatory spots will particularly appear around the mucous follicles, which then show themselves as hard, prominent, whitish accumulations. Thus, there is a great variety of cases, while those who have a hereditary predisposition are most affected, and most exposed to relapses ; and such cases as are of a phlegmonous character, being more severe, and less liable to suppuration, than those being merely superficial and erythematous. As a general rule, the prognosis is a very good one, absorption of the inflammatory swelling taking place after a number of days or weeks. Suppuration will sometimes occur, and the tonsillar abscess break after a number of serious symptoms, depending on aggravated deglutition and respiration, or chronic induration will take place, such as I have alluded to before ; or the swelling of the mucous membrane, and effusion into the submucous tissue taking place to a considerable extent, œdema of the adjoining parts, thus, for instance, of the glottis, may ensue, and give rise to highly-dangerous symptoms. This, however, is a very rare result of pharyngitis, scarcely any more frequent than gangrene, or any of those frightful accidents, so much dreaded.

I have stated that pharyngitis is frequently complicated with, and in fact is even dependent on, the existence of stomatitis. I do not believe that after the preceding remarks you will be impressed with the influence of dentition, in producing severe affections of the mucous membrane of the mouth. Still less have we reason to attribute pharyngeal symptons to any great extent to the protrusion of teeth. Nor is there any necessity of falling back on unknown, or hypothetical, or improbable causes, where there are many manifest ones. Acute pharyngitis is frequently noticed in the heat of the summer, complicated with troubles of the digestive organs, loss of appetite, furred tongue, headache ; it is easily brought on by a sudden change of temperature, general, or local, and individual, or by the direct influence of cold temperature on the mucous membrane of the pharynx. This occurs particularly in such children as are used to breathe with their mouths open ; here you have one of the reasons why it is so necessary to accustom children to have their mouth shut, and breathe through the normal passages. Other cases of pharyngitis are brought about by direct lesions, by means of hot food and beverages, stimulants, and sharp-pointed bodies being brought in contact with the mucous membranes. Others are observed during the course of diseases of the tongue, bronchia, and lungs, apparently from the mere contiguity of the mucous membrane. Another number, and not a small one, is produced by the influence of epidemic diseases. Particularly the eruptive fevers have a tendency to be localised on the mucous membrane of the pharynx, thus morbilla and variola, but more than any others, scarlatina and diphtheria. During the last few years, the influence of these two, especially of diphtheria, has been exceedingly great in this city, and a large part of the country, so much so that the greater percentage of diseases occurring in children were either directly seated in the pharynx, or complicated with a pharyngeal affection. I have been accustomed to inspect every child's pharynx when brought in for any sickness, not that every pharnygeal complication must necessarily be a very serious disturbance, but because I want to know the full range and extent of a disease, and, gentlemen, because a number of doubtful cases will be found to be nothing else but an inflammatory or exudative pharyngeal affection, in such times. The large number of pharyngeal affections occurring in this city for the last few years certainly depended on the prevalence of scarlatina and diphtheria, especially the latter; pharingitis either following for a long time, or followed by, diphtheritic exudation. So frequent have these cases been, that it has been possible to form whole classes of cases under the heads of diphtheritic pharyngitis (without any exudation being present), and diphtheritic fever.

What I, therefore, lay particular stress on, is this—that a large number of cases of pharyngitis occur in early age, that their causes are both various and frequent, that the pharynx is particularly exposed to injuries, and that a large number are brought on by the direct influences of epidemic diseases. I may add that the protrusion of the teeth ought not to be referred to as a cause of pharyngitis, as epidemic diseases are more found after the first and second year than before. And I finally desire you to remember this caution—viz., to examine the pharynx of a child at least in every case in which the diagnosis is doubtful. By doing so you will not only reduce the number of uncertain diagnoses, but you will reduce the number of cases of "difficult dentition" considerably. You will often find pharyngitis, with or without stomatitis, to be the simple and easily removed cause of many serious troubles attributed to dentition.

There is no more connection between the mode of treatment of pharyngitis and dentition, than there was between the nature and etiology of both ; local and intestinal derivants, diaphoretics, purgatives, and emetics have been recommended. Gargles have been resorted to in advanced children ; mustard-plasters and cold water, according to hydropathic principles, have been applied. Have they anything to do with dentition, or is the protusion of a tooth rendered easier by these, any more so than by the incision of a tonsillar abscess ? I think not, nor do you ; what I think is, that dentition as a means of producing pharyngitis, except in those few cases in which stomatitis and consecutive pharyngitis may be the result of an abnormal protrusion of an abnormal tooth, through an abnormal gum, in abnormally irritable children, is a very unimportant and uncommon factor. As to treatment, I should again urge the administration of chlorate of potasssa, or soda, both internally and locally. I have not seen better results from any other medicine in any case which was not past the possibility of absorption.

One of the forms, or sequelæ, of common pharyngitis is retro- or latero-pharyngeal abscess. Pain is rather severe, and exudation considerable. A semi-spherical, livid, brilliant tumour is seen, or felt, on the posterior wall of the pharynx (or laterally). Respiration and deglutition are difficult; there is cough, thickness or hoarseness of the voice. Emaciation takes place from want of nutrition; fever is very high, to such a degree sometimes that convulsions ensue, brought on besides by the swelling of the tissues of the neck and compression of the veins. It generally comes on pretty slow, and by this fact may sometimes be distinguished from acute amygdalitis or stenotic diseases of the larynx. Its termination depends on the change taking place in the abscess; if the pus is removed, respiration and deglutition are restored, and the danger of suffocation removed, and all the severe symptoms disappear. This will occur spontaneously sometimes, but in a majority of cases incision is necessary. I have observed a child of about seventeen months of age, who had to perish from suffocation, as the parents were opposed to a simple incision into the latero-pharyngeal abscess, though easily accessible. There is, therefore, urgent danger of suffocation, from the mere size of the abscess and the swelling of the surrounding tissue, especially the velum palati and posterior nares; there are other dangers from the transmission of the process to the larynx, and thereby increasing the chances of suffocation or creating those of tedious and grave consecutive diseases; or to the Eustachian tube, thereby giving rise to either impaired hearing or perpetual deafness. The danger from deglutition is not so great; at all events, food can be missed longer than air, and moreover there are other ways of introducing food into the system, besides the mouth and stomach, in cases of necessity. The chances of consecutive diseases, too, impairing the process of deglutition, are not very great, although a simple catarrhal swelling of the pharynx, or œsophagus, will fully suffice to give rise to a constant dysphagia.

Retro-pharyngeal abscesses are seated in the cellular tissue connecting the pharynx and vertebral column. They may well be classified under three heads. Some are developed idiopathically, from an inflammation of the mouth and pharynx, and the surrounding tissues, the inflammation originating from either a simple catarrhal affection or a metastatic process, influenced by an acute exanthem, typhoid fever, or pyæmia. The majority of the cases of this form occur before, or at the time of the first dentition; this period of life showing generally the greatest tendency to catarrhal affections. This simple physiological fact has evidently been the reason why retro-pharyngeal abscess has been thought to depend on, and to be caused by, the protrusion of teeth. The prognosis in cases of this class is generally favourable, unless the incision of the abscess is neglected; with the only exception of metastatic abscesses, which are but symptoms of a more or less grave affection of the whole system. Therefore, in these latter cases, every hope of a lasting cure depends on the possibility or probability of a cure of the original morbid process. Idiopathic abscesses generally, when in their first stage, require a rational anti-phlogistic local treatment; application of cold, both externally or internally; the latter, by slowly swallowing ice, or gargling with ice-water, with or without alum; local application of nitrate of silver, or alum; scarifications of the pharynxes; leeches. When the other stages of the inflammatory process cannot be repelled, warm poultices appear to be preferable, except in instances of imminent danger from symptoms of cerebral congestion; in these cases warm emollient gargles do better. Internal treatment is unavailing, except for the purpose of diminishing the fever, or other dangerous symptoms; tartar emetic has been frequently recommended, but also rejected. Where the symptoms are very grave, and suffocation imminent, the safest and quickest remedy is incision of the abscess, and the washing out afterwards of the abscess, by gargling or syringing. Metastatic abscesses require incision, only to remove the utmost danger from suffocation, as the principal attention has to be paid to the general process. After the incision has been made, water is not sufficient for the wound to heal, but stimulants and astringents, chloretum calcariæ, alumen, nitras argenti, acidum tannicum, are required, and an internal treatment has to be resorted to, according to the general affection; bark and mineral acids will often prove necessary.

The second class of retro-pharyngeal abscesses are secondary, being produced by the suppuration of inflamed lymphatic glands and the surrounding tissues. They are rarely found in early infancy—viz, at or before the time of the first dentition, but at a later period, which is more favourable to scrofulous and inflammatory swellings of the lymphatic glands. It is not our fault that the second dentition may fall within the range of this period. The prognosis in these cases is not very unfavourable, although it depends on the gravity of the original suppuration, and the amount of general morbid affection. The local treatment is much like that recommended in idiopathic cases, with this exception, that the original glandular abscess requires particular attention. Incisions from outside will frequently suffice to remove all the pus formed, and to relieve the consecutive pharyngeal and laryngeal injection. The gravity of the general dyscrasic affection, which gave rise to the primary suppuration, requires great care; iodide of potassium, iodide of iron, cod-liver oil, air, exercise, attention to the skin, and generous diet being strongly indicated

A third class of retro-pharyngeal abscesses owe their origin to the suppuration of cervical vertebræ, or their ligaments. They are seldom found before the age in which secondary abscesses have been observed, caries of the cervical vertebræ and well-developed tubercular disease generally being more common in later life. Their prognosis is very unfavourable. Incisions, which ought to be made as late as possible, are only of momentary use, they being unavailing in relation to the primary affection. As in all such diseases as resist treatment (all being nearly hopeless), a large amount of remedial agents, diatetic and pharmaceutical, have been recommended; you may consider it to be a general rule that the number of remedies (infallible remedies) recommended, increases in proportion to the hopelessness of a disease or a given case. Quiet, posture, cold, leeches, mercury, and wine, both externally and internally; calomel, nitrate of potassa, tartar emetic, iodide of potassium, and iron, have been recommended, according to indications. They have been used and abused in many cases. These will generally terminate fatally; either slowly, by hectic fever and exhaustion, or very suddenly indeed. I have seen a young man die suddenly while turning his head on the pillow. Making the post-mortem examination, I found the ligaments of the vertebral column, in its upper part, mostly destroyed; a few remnants had been torn by the last move of the patient, and the process of the axis entered the foramen magnum, destroying the tissue of the medulla oblongata.

PROCEEDINGS OF DENTAL SOCIETIES.

COLLEGE OF DENTISTS OF ENGLAND.

MONTHLY MEETING.—November 5, 1861.

G. Waite, Esq., President, in the Chair.

The first Monthly Meeting of the Session, 1861-62, was held on the evening of Tuesday, November 5th. The chair was occupied by the President.

The Minutes of the last Meeting having been read and confirmed,

Mr Waite was glad to find so full an attendance of the members at the commencement of the Session, and hoped that they would continue to carry out the objects of their meetings with the same energy as they had displayed during the last Session. He trusted that some of the younger members of the Society would avail themselves of these opportunities for gaining instruction, and that they would also be induced to bring forward any cases or observations that may have occurred to them in practice: every facility would be afforded them for so doing. He begged to introduce to the members Dr Coar, who would read a paper

"On the Effects of the Deciduous Teeth upon those of the Permanent Set."

The object of the paper was to show the necessity of attending to the temporary teeth from the period of their eruption. The writer advocated the stopping of the temporary teeth when attacked by caries; believing that if they were allowed to go on decaying, they were liable to produce disease in the permanent teeth. The paper is given in full in another part of the journal.

Mr Waite thought the subject afforded a good field for discussion, although for his own part he had seen no very good results from stopping deciduous teeth; the attempt was generally unsuccessful, much to the disappointment of the parents. He believed that generally speaking the teeth in this country were paid greater attention to than elsewhere, and that an early use of the tooth-brush was beneficial.

Mr Hulme considered that the reason why the attempt at stopping the deciduous teeth failed, was because the children are not brought to the dentist sufficiently early. Decay goes on unperceived by the parent, and it is not until pain has arisen that the advice of the dentist is sought. He believed that by the use of a proper diet, and by prohibiting the indiscriminate use of sweets and similar substances, caries of the deciduous teeth might be altogether prevented in a large number of cases.

Mr Robinson did not quite agree with Dr Coar that the chemical action arising from caries of the temporary teeth affected the permanent molars.

Mr Kempton wished to know Dr Coar's reasons for thinking that the deciduous teeth when decayed affected the permanent ones by contact.

Mr Rymer understood Dr Coar to imply that it was from the chemical action arising from decay that the permanent teeth were affected, and not by simple contact.

Mr Williams mentioned the case of a child seven years old who had lost nine teeth from the accumulation of tartar, although the tartar was constantly removed, absorption of the gums continued, and the teeth fell out. He thought no local treatment would have been beneficial in this case.

Mr Waite had generally found that the permanent molars were decayed in their crowns, and he did not think that their being in contact with decayed temporary teeth had anything to do in causing such decay.

Dr Coar having replied, the President proposed a vote of thanks to Dr Coar for his able and interesting paper.

The next Meeting was fixed for Tuesday, December 3rd, when a paper will be read by Mr Henry on "Dental Caries." The chair to be taken by Mr Rymer.

A vote of thanks to the Chairman terminated the proceedings.

Election of Members.—At Meetings of Council, held on the evenings of Tuesday, October 1st, 22nd, and November 26th, the following gentlemen were elected Members and Associates of the College:—

Members, W. J. Whatford, Esq., Western road, Brighton, and Dr Firman Coar, Wigmore street, Cavendish square.

Associates, Messrs Henry John Woodcock, Park square, Leeds; Thomas Bunker, Cambridge place, Shepherd's bush; John Powell Webb, Morton terrace, Kentish town; and Charles Alexander, of Vincent terrace, City road.

MEETING OF EXAMINERS.—At a Meeting of the Court of Examiners, held on Thursday, October 31st, Messrs Hasler Harris, M.R.C.S., of Gower street, Bedford square, and Henry Greenfield, of Mortimer street, Cavendish square, were admitted Members of the College by Examination.

ODONTOLOGICAL SOCIETY OF LONDON.

ORDINARY MEETING.—NOVEMBER 4TH, 1861.

W. M. BIGG, ESQ., President, in the Chair.

THE Society held its first Meeting for the Session 1861-2, November 4th, 1861; W. M. Bigg, Esq., in the chair.

A paper was read by Mr Tomes, *On Certain Conditions presented by Amalgams used in Filling Faulty Teeth.*

After speaking of amalgams generally, and the circumstance which led to the reading of the paper, Mr Tomes related the following experiments which he had performed with a view of testing the qualities and properties of some of the various kinds of amalgams which are supplied to the Profession by the different makers.

" In conducting the experiments, slips of ivory have been prepared, the size of each being similar excepting in a diminished width to the ordinary glass slide used for mounting microscopic preparations. Each ivory slide is perforated through its centre by a perfectly cylindrical hole. When about to be used, the slide is firmly clumped down upon the flattened surface of a block of ivory, by the assistance of which the cylindrical perforation is converted into a cylindrical cavity—having a perfectly flat floor lying at right angles to the walls. On the under surface of the slide several minute angular fissures have been cut into the edge of the wall of the cavity by a very small four-angled file. This expedient has been adopted for the purpose of testing the readiness with which the amalgams used enter minute fissures.

The amalgam has been introduced with ordinary care, and forced into the experimental slide with a round-headed burnisher sufficiently small to enter with readiness the cavity.

When the amalgam has perfectly hardened, the clamp is relaxed, and the slide withdrawn from its position on the block of ivory, thereby exposing for examination that portion of the plug which rested upon the floor of the cavity, together with the fissures in the wall produced by the file.

The amalgams in general use may for convenience be arranged into two groups. Those which are combined with mercury as a preliminary proceeding, the mass being softened by moderate heat, and the excess of mercury squeezed out prior to the introduction of the plastic mass into the tooth. And those which are completed by the addition of the mercury to metallic filings at the time of use. Of the former kind, I am aware of two varieties only. The one formed by the solution of pure copper in mercury; the other, Sullivan's cement, compounded, it is said, of copper mainly. Each of these have been subjected to the experimental test already described, and with the following results:—In test slides Nos. 1 and 2, the amalgam when it has hardened in contact with the ivory forming the bottom of the cavity presents a fine granular surface. It has failed to penetrate into fissures extending from the sides of the cavity in the one slide; and in the other it has separated from the wall of the cavity. In neither slide is the cavity fully and entirely filled. The microscope shows that the plug is in neither case perfect. In slide No. 3, the pure copper and mercury was introduced. The process of hardening has not in this case been attended either with the same amount of contraction, or of change of surface, as in the preceding specimens, in which Sullivan's cement was used. Indeed, this specimen exceeds any other I have examined, both in respect to the smoothness of surface it preserves, and to the closeness with which, after hardening, it is applied to the surface of the cavity in the ivory slide. In slides Nos. 5 and 6 an American amalgam, sold by Messrs Jameson, of Glasgow, was employed. This compound has hardened in contact with the ivory, with a very rough, granular surface, and the mass has obviously contracted, so that had the surface been such as when closely applied to the walls of the cavity would have served to exclude the ingress of moisture, the general contraction would have rendered that property useless. In each case the filings were carefully rubbed with the mercury in a mortar, and the mass when perfectly incorporated was previous to introduction washed with ammonia.

In preparing slide No. 8, the filings sold by Messrs Ash, were incorporated with mercury in a mortar, the mass washed in ammonia, and then, after the expression of the superfluous mercury, introduced into the test slide. The result is a plug presenting a fine granular surface where hardened in contact with the ivory, and a considerable amount of separation from the walls of the cavity; the obvious result of contraction.

In slide No. 9, the same materials were employed, but the combination was effected by rubbing the filings and mercury together in the palm of the hand. The washing was also omitted. The result due to the difference of manipulation is a plug presenting a much rougher and more granular surface than No. 8. It is separated from the walls of the cavity; and the mass has failed to enter the fissures prepared to test its powers of penetration.

Slide No. 10, contains an amalgam furnished to me by Mr Jameson, and consists of the following ingredients: tin, 10½ dwt., silver, 1 oz., gold, 1 dwt. The filings were incorporated with the mercury in a mortar, and subsequently washed with ammonia, the excess of mercury squeezed out, and the mass introduced into the cavity in the manner described. The bottom of the plug showed a broken and granular surface, and an incapability of penetrating into minute fissures.

Specimen slide No. 11, contains a plug introduced by our treasurer, Mr Rogers. It consists of pure palladium and mercury, the two metals having been combined by friction in a mortar. In this plug, there are obvious indications of contraction. I am indebted to Mr Rogers for a second specimen, No. 12, in which the results are more satisfactory; but in this, the metal has not penetrated into all the fissures. The surface presented by each of the palladium plugs is very finely granular, but not in this respect superior to the copper amalgam.

In producing the specimen plugs, the operation has in each case been conducted with care, and the results are quite as favourable as would have been obtained in the course of practice. Having discovered the difficulty of forcing an amalgam into minute fissures, I might by specially directed efforts have obtained more successful results, but my object has been to test the qualities of the several compounds when employed in the treatment of carious teeth, with the usual amount of care. I may mention that if an excess of mercury be retained with a view of rendering the operation more perfect, the failure will not be less pronounced. The mercury will be squeezed out into the fissures, leaving the solid metal behind. Again, if the mass be deprived of mercury, so as to render it crumbly, the surface of the resulting plug where resting against the walls of the cavity, will be broken and irregular.

My investigations up to the present time, lead to the conclusion which an examination of the specimens before the Society will, I think, fully justify, that our present knowledge respecting the compounding of amalgams suitable for dental purposes, is in a very unsatisfactory state. Take, as an example, the two specimens of palladium plugs; in each of which, the composition is supposed to be similar, while owing, perhaps to slight differences in the manipulation, or to the quantity of mercury used, a want of uniformity in the results has been produced. Again, a plug produced by rubbing mercury with the filings prepared by Messrs Ash, in the palm of the hand, varies considerably from another in which the mercury and filings were thoroughly incorporated in a mortar, and the mass washed with ammonia. When the uncertainty in the character of an amalgam plug is admitted, and the difficulty in forcing the metallic paste into fissures or minute angles is acknowledged, we need not, I think, be at a loss to account for the difference of opinion which prevails respecting the durability of amalgam plugs generally, and respecting the comparative excellence of the several kinds of amalgams.

There are those who prefer, before all others, the pure copper amalgam, and if regarded for its physical properties only, it unquestionably stands in the foremost rank; but the black colour it assumes and imparts to the tooth, and the strong metallic taste its presence in certain cases establishes, justify its condemnation; still, notwithstanding these objectionable qualities, I doubt whether we should be able to find amalgam plugs, which have preserved teeth for a greater number of years than such as have been composed of copper and mercury. A palladium plug, if produced under the most favourable circumstances, is in its physical characters equal to one of copper, and the great superiority in its chemical character, place this amalgam at the head of the list. At the present time, the metal is so rare that its general use, even in the quantity which might be required for dental purposes, is prohibited. So far as my own limited experience has gone, the qualities of the samples furnished have varied. In some cases, the mass has hardened with such rapidty, that an insufficient time has been allowed for its introduction into the tooth; in other specimens, the hardening process has extended over some hours—a variation suggestive of differences of composition."

A long discussion followed the reading of the paper, the President observing that as Mr Tomes had not tested all the stoppings sent to him, that the Meeting must rely upon that gentleman for further investigation.

NATIONAL DENTAL HOSPITAL.

INAUGURAL MEETING.

THE importance of establishing a Dental Hospital has long been recognised by the supporters of the College of Dentists. Its necessity was pointed out to the members by a gentleman, to whom the profession is deeply indebted for presiding at its first public meeting in 1856; at the close of a lecture delivered at the College, May 14th, 1857, in these words—"Never rest for one moment from your labours until you have established a DENTAL HOSPITAL and DISPENSARY. The poor of this great metropolis require aid, and your students require ocular instruction. Your course of study will never be complete without clinical lectures, and the positive education afforded by hospital practice; do not lose sight of this point, as you value the advancement of your profession."

The Council of the College *did not* lose sight of the point, but carefully discussed the subject; however, the amalgamation discord put a stop to immediate action, and the plans approved were carried elsewhere. With the progress of time the Metropolitan School of Dental Science was successfully opened, and the want of a hospital under an independent management became apparent. Thus many friends of the College bestired themselves, and as the additional charity proposed could not but prove an advantage to the poor, liberal helpers were speedily found. Amongst these should in justice, be named Mr Robinson, as pre-eminent; so that, in point of fact, the establishment of both the existing Dental Hospitals is mainly owing to that gentleman's energy.

The organisation of the National Dental Hospital has, nevertheless, not been effected without many difficulties, but these have been well overcome by the zealous and able Committee of Management, as will be presently seen.

All preliminaries accomplished, premises were secured at 149 Great Portland Street, in every respect suitable for the purposes of the hospital. These premises having been put into thorough order and furnished with all necessary appliances, were opened in a formal manner on Monday evening, November 11th ultimo, at seven o'clock. The Inaugural Meeting took place in the Board-room of the hospital, which was very fully attended by subscribers, indeed many were unable to obtain admission.

Amongst others present we noticed Dr Brady, M.P., Dr B. W. Richardson, Dr Pavy, Dr Payne, P. H. Bird, Esq., Dr Jones, Dr King, Dr Thane, J. Robinson, W. Imrie, R. T. Hulme, George Waite, W. Perkins, A. Hockley, W. Ash, G. Ash, F. Coar, W. R. Wood, S. Lee Rymer, S. A. Hayman, T. C. Vidler, Geo. Williams, Has'er Harris, H. C. Betts, T. Hopkins, D. J. Brennies, H. T. Kempton, T. Little, H. Faro, G. Henry, C. Stoddart, W. Taylor, W. Bunting, J. Stewart, A. H. Baker, James Mason, W. H. Macphierson, G. Salter, T. Hoyle, A. Medwin, P. Beaurguard, G. Rowlands, C. Collard, Esqs., &c. &c.

A few minutes after seven o'clock, Mr Robinson rose and said—The Committee of Management had deputed him to fulfil a duty which h- incerely regretted had not fallen into abler hands. He had great pleae ure in proposing the name of a gentleman for chairman on that occasion which was familiar to them all, namely, that of Dr Brady, M.P.—(Applause.) It would be in their recollection that on a former occasion that hon. gentleman had taken the chair, and had ably filled it, at the College of Dentists, on the occasion of the distribution of prizes. Now he had offered to the hon. gentleman to allow him to be the first patient to receive the benefits of the hospital (as he was complaining of a tooth) either that evening or to-morrow, but he had refused the offer.—(Laughter.) He was sure they ought all to congratulate themselves and the public that they had among them a man who was so eminent in his profession, of which he was an ornament, and who, as a member of Parliament, took such intense interest in the profession. The hon. gentleman was one who, not only as a member of Parliament, would assist them, but would do so in exerting his influence to obtain subscribers. He had, therefore, to propose that Dr J. Brady, M.P., do take the chair.

Mr Rymer seconded the proposition, which was carried by acclamation.

Dr Brady having accordingly taken the chair, said—He had not the slightest doubt in his mind that he should receive from a body of gentlemen such as that which he had the honour to address, that indulgence which was ordinarily granted to one who presumed to undertake the responsibility of filling the chair on such occasions. He asked their indulgence, because he had taken the office upon himself at a short notice, as it was not intended that he should preside over this meeting, but that another should have done so who would have done honour to the institution, and who would more completely have expressed the views of the promoters of the hospital, but that gentleman, a member for the borough, was engaged in presenting colours to his rifle volunteer corps. If that honourable gentleman had not been so engaged, he would have been present here to promote the cause for which they were assembled. He found on looking over learned statistical works connected with the metropolis that there were twelve general hospitals, some of them being largely endowed institutions, which of themselves did, and had done great benefits to society. He found that two of these institutions were established before the 15th century. One of these, St Bartholomew's, was an institution which had done great and lasting services; and the other was no less renowned, he meant St Thomas's Hospital. But however strange it must appear, the fact was that for 200 years afterwards, at least till the 15th century, there was a lull, and no movement was made for establishing such hospitals. Previous to that period the monks and the religious houses fulfilled the required offices. But after the 15th century people seemed to think that there was no necessity for relieving the wants of the poor in this respect, and it was not till the year 1718, and in 1745, that he found that five more were added to the number of twelve general hospitals then existing. There followed another calm, and then another hospital was added, but it was not till 1818, that these were commenced, and in 1850 were completed; that these were the five more established general hospitals, not including special hospitals for diseases of the chest and small-pox. But these twelve general hospitals, by the last report, received 142,000*l.* a-year of annual revenue, which included contributions and subscriptions, as well as real property in the funds and in land. Out of these twelve institutions, from whence so many eminent physicians and surgeons had emanated, none of them had ever specially instructed their pupils in the science of dentistry.—(Hear.) It was a wonder, only some years ago, to find a practitioner who could tell the number of teeth in a man's head, during the time of the jaw-breaking key. Up to that time there had been little progress made in the Science of Dentistry; but in the short space of six years there had arisen a body of gentlemen who were wise in their generation, who thought it was necessary that such a stigma should not be allowed to remain upon the Profession at large, and they boldly banded themselves together to establish a Dental College.—(Cheers.) That Dental College had already led to great and beneficial results. That College was presided over by men of intellect, who thoroughly comprehended the importance of their Profession, and knew well what they were about. The most important result from that society was practically demonstrated in the meeting this night.—(Loud applause.) He regretted, he would say he most sincerely regretted, the fact that any disunion should have arisen among the great body of the Profession; and he hoped this night would be one of peace-making, and that they would all unite as one man in carrying out the great object they had in view. He regretted that the apple of discord had been thrown in amongst them, but it was the fruit of the clause in the Medical Act which gave the power to the College of Surgeons' to grant special certificates, a clause he had ever opposed. Some men thought it was important that they should be established in the College, and they accordingly took out certificates, thinking they were doing themselves a lasting service! But those whom he addressed knew, as practical men, that however able the examination might be as to the knowledge of the anatomy or the physiology of the teeth resulting therefrom, they had no test by which the mechanical portion of the Profession could be reached; and they all knew that, unless a man had a thorough knowledge of the mechanical department of Dentistry, all his philosophical and anatomical knowledge would be in vain to carry out the great objects of the Profession. Who knew so well as his learned friend on his left, who had thrown himself heart and soul into the cause, who had been in the front of battle, and would carry them to victory—who knew so well the maladies which were produced by improper treatment of cases?—(Applause.) Who did not know the evils arising from neglected teeth? The hon. gentleman next alluded to the frightful condition of the poorer classes, who so much needed the aid of such an Institution as this, but who now seemingly appreciated the value of sound teeth. In conclusion, he thanked the meeting for the attention with which they had heard him.—(Cheers.)

Letters from various gentlemen were read by the Honorary Secretary, in which the writers expressed approval of the objects of the Institution, and regret at inability to attend the meeting. Amongst others, the following from Dr Carpenter:—

"Croydon, November 11, 1861.

"MY DEAR SIR,—Professional engagements which I cannot postpone will prevent my being present at the Inaugural Meeting of the National Dental Hospital this evening. Will you kindly present my excuses, and say how sorry I am not to take part in such an important occasion and, at the same time, state how cordially I congratulate the Committee of Management and the College of Dentists upon such an important result of their labours.

"Wishing the National Dental Hospital every success, and sincerely regretting my inability to be present,

"Believe me, faithfully yours,

"ALFRED CARPENTER.

"T. C. Vidler, Esq., Hon. Sec."

The Minutes of the General Meeting, held June 4th, and at which the determination to establish the Hospital was adopted, were then read and confirmed. After which the Chairman rose and said—"It is now my pleasing duty to declare the NATIONAL DENTAL HOSPITAL opened!"—(Much applause.)

Mr LITTLE, of Bristol, begged to propose a hearty vote of thanks to the Committee who had laboured with so much assiduity in accomplishing the great result that evening witnessed. The motion having been duly seconded, and warmly carried,

Mr HULME returned thanks on the part of the Committee of Management, and said they were greatly indebted to the untiring energy of Mr Robinson for the success which had attended their labours.—(Cheers.) Indeed, without such assistance they would not have accomplished the object they all had in view. He eloquently dwelt on the necessity of such a hospital for the poor, and concluded by proposing a vote of thanks to Mr Vidler, Hon. Secretary, and the motion having been seconded by Mr ROBINSON, was carried by acclamation.

Mr VIDLER suitably acknowledged the compliment.

Dr RICHARDSON proposed a vote of thanks to the fourth estate, the Press, and the motion having been seconded by Mr JOINES, was carried by acclamation.

The resolution was responded to by a gentleman present, who has long been connected with the Press.

Mr WAITE (President of the College of Dentists), in proposing a cordial vote of thanks to the honourable Chairman, congratulated him on the support of so large a meeting, at the same time regretting the unavoidable absence of two eminent members of the Medical Profession, whose attendance was expected, and who took a great interest in the cause of Dental education. In common with Dr Brady, he lamented the disunion existing in the Profession, which was certainly owing to the cause referred to by that gentleman in his able address. He believed that an independent charter was not far distant for the Dental Profession, and had it not been for the unwise policy forced upon the College of Surgeons, such a charter would, ere this, have been secured. Already, the more thoughtful of their opponents must see the error they had fallen into, and would, no doubt, rejoice in common with themselves when the Profession possessed its own charter, as it certainly must do. After some observations on the necessity of appointing dentists to the army—a sound condition of the teeth being necessary to the soldier's health, and, therefore, a matter of national importance, he moved a vote of thanks to their worthy Chairman for presiding on the occasion, and for the general interest he had evinced in the cause of dental reform. (Cheers).

Mr HAYMAN seconded the motion, which having been carried with enthusiasm,

The CHAIRMAN replied, and alluded to the facts that all great truths in this country had had to establish themselves in connection with feuds; the masses would hold back, and without pioneers in all great movements, society would stagnate. He mentioned the fact that Dr Carpenter, of Croydon, four years ago, suggested the propriety of having Dental Hospitals, and he was happy to see the idea practically carried out.—(Cheers.)

The meeting then dispersed to examine the general arrangements of the Hospital.

In the course of the evening the Secretary announced that about 300*l.* had been received in donations and subscriptions, including a donation of five guineas from the respected Chairman.

At the close of the procedings, a select company, nearly fifty in number, were invited to a late dinner, served in *recherché* style, in an upper apartment of the hospital. The viands and wines reflected much credit on the caterer, and were done full justice to by those assembled. A thoroughly agreeable evening was spent, and, altogether, the Inauguration of the Hospital was a complete success. The elegant entertainment at the close was most liberally given by Mr Robinson, to whom the honour of founding the Hospital is, by universal consent, accorded.

CORRESPONDENCE.

TO THE EDITOR OF THE 'DENTAL REVIEW.'

SIR,—The November issue of the 'British Journal of Dental Science' brings with it another tit-bit of spleen, vented with its usual ill-humour upon the opening of the Dental Hospital.

Really, I wonder (and I should suppose I am not alone in my wonderment) when the editor of that Journal will cease his monthly vituperation against the College of Dentists, and its doings. I am certain that the space usually occupied in breathing forth his vengeance, would be far more pleasantly and instructively filled by articles of scientific usefulness, of which there has latterly been so great a dearth in its pages; at the same time, it would be more satisfactory for its readers to subscribe for science, than for scandal.

Now, Sir, as the College never interferes with him or his, but is content to stand or fall by its own merits, would not he (the editor of the 'British Journal') do well to follow the example thus set him, by the object of his monthly wrath? To mind his own business would certainly pay him better than troubling himself or his readers with prophetic warnings of the misfortunes which he wishes certain establishments, or persons, to fall into. I may be considered as being rather warm on the subject, but the fact is, that having subscribed to the 'British Journal' from its commencement, and having continually read the same kind of vituperative abuse against the College of Dentists, I am disgusted and wearied with its repetition, and feel compelled to speak out.

In America, Sir, there are many Dental Colleges, all united in the one great effort to perfect and to raise the Profession; we see no disunion amongst them; we hear of no paltry rivalry, or jealousy, pervading their transactions. I have read the Dental literature of that country from its commencement, and can nowhere find such language as that used by your contemporary.

Surely, Sir, when we consider the vast population of this country, it must be admitted that there is room for two kindred institutions; and what, in the name of common sense, should prevent the two from raising themselves proudly together, and bestowing their benefits on suffering humanity, and thus harmonising, one with the other, for the good of all.

Sir, it is high time that ill-feeling should cease, and make way for sober reflection, so that there may be peace and goodwill amongst the Members of the Profession for the well-being of all.

Yours, &c., DENS PROVINCIALIS.

MISCELLANEOUS.

Mr Edwin John Winterbottom, M.C.D.E., of Sloane street, Chelsea, was admitted a Member of the Royal College of Surgeons at a Meeting of the Court of Examiners, held on Thursday, the 14th ult.

Dental Appointment.—Mr Frederick Bullin has been elected Dentist to the Chester Infirmary, in place of Mr Joseph Snape, resigned.

Important Hull Dentist Case.—In the case of Moseley, *v.* Abel, which was recently tried in the Vice-Chancellor's Court, and in which the plaintiff sought to recover damages from the defendant, who had formerly been his assistant, and who had covenanted to remain with him for a period of five years, and that for seven years after the determination of the agreement, he would not practice, either for himself or others, in certain towns and places named in the agreement. The defendant left after being with plantiff two years, and did commence to practice in some of the prohibited places. Upon this, the editor of the 'Dental Cosmos' has the following sensible remarks :—

"The above case is presented in illustration of a principle, rather than on account of any interest in the parties concerned. The principle referred to is the folly, not to say injustice, of one practitioner exacting from another an agreement not to practice the Profession in a given locality for a certain number of years after the expiration of all business relations between them. For the credit of a Profession that claims to be a liberal one, it is to be hoped that such arrangements are rarely proposed or entered into. Even when agreed upon, as in the present case, they are almost invariably violated by one of the parties, and lead to criminations and recriminations which eventually terminate in lawsuits—contingencies that all properly constituted minds desire most devoutly to be relieved from. While far from intending to defend one who has violated an agreement with another, we yet feel, on the other hand, impelled to condemn, in unmeasured terms, the harsh restrictions contained in the agreement. No professional man has a *right* to dictate such terms. He can only serve a certain number of persons, and has no right to deprive the rest of the community of service more valuable, perhaps, than his own. The world certainly is wide enough for all, and those who honestly, ably, and persistently serve their fellows, should and will meet with encouragement and reward."

Furred Tongue on one side caused by a Decayed Tooth on the same side.—As I purpose making the case of gangrene of the fingers from pressure upon the ulnar nerve the culminating point of a little group of cases bearing upon this subject of physiological rest, or rather the evil resulting from the want of physiological rest to the nerves, I must request your attention to this sketch of a tongue furred on one side, and comparatively clean on the other. I dare say some of you, at first sight, wondered what this representation could be intended to elucidate, beyond the bare fact of one side being tolerably clean, and the other somewhat furred. Now, this furred condition of the tongue, let me say in anticipation of what I have to speak of more in detail, is frequently associated with a diseased condition of the second division of the fith nerve ; in fact, it is a functional and structural deterioration depending upon nervous influence, in that respect very much resembling what we have already seen in its extreme condition in the case of gangrene of the fingers.—Mr Hilton's Lectures on "Pain, and the Therapeutic Influence of Mechanical and Physiological Rest in Accidents and Surgical Diseases," *Lancet.*

Furred Tongue on one side ; Second Molar Tooth of Upper Jaw Diseased.—This last spring, a lady, whom I have known for some years, consulted me regarding some matters not of importance, and I, perhaps not for any very precise purpose, said, "Let me look at your tongue." She put out her tongue, and it was furred on one side. I said, "You have a bad tooth," and she thought it was exceedingly clever on my part. "Yes," she replied, "and I am going to Mr Bell to have it taken out." She went and had it extracted; I saw her a fortnight afterwards, and all the fur had subsided. This was a second molar tooth in the upper jaw of the same side as the furred tongue. Very recently my own boot-maker had some little accident, and he came to my house to consult me. I found he had a furred tongue on the right side, and I remarked to him, "You have a decayed tooth in your upper jaw." "No," he said, "I have not; but I have had a bad tooth stopped, and it is very painful when I touch it in this way (pressing his finger upon his cheek over the tooth); almost the whole of the time since I had my tooth stopped, my tongue has been like this." Now these cases, taken together, and made into a series or small group, seem strongly to suggest the influence of irritation, or of pressure upon what we may call common spinal nerves, grouping the fifth nerve as a common spinal nerve, although it has its relation only with the face and the head.—'Ibid.'

Diseased Molar Tooth of the Lower Jaw producing Excoriation of the Auditory Canal on the same side, amd an Enlarged Lymphatic Gland, cured by Removal of the Tooth.—In last year's lectures I mentioned that a professional friend of mine had suffered from a condition bearing on the subject of the influence of nerves upon the structures supplied by them. That friend, unfortunately, is no more. It was Dr Addison to whom this happened. The case is one of some interest, and I will repeat it in a few words. Some years ago Dr Addison had a very offensive discharge from the auditory canal of one of his ears, which annoyed him very much; and below the external ear was a small gland enlarged in the upper part of the neck. He had tried various remedies for this discharge, and had gone, I believe, to some surgeons who attended specially to the ear; but, as far as I could learn, no good resulted from any of the applications. Upon examining the ear from which the offensive discharge proceeded, I found a slight ulceration upon the floor of the auditory canal. On arguing the question out between us, we came to the conclusion that the ulceration probably depended upon a diseased molar tooth in the lower jaw on the same side. We had that tooth extracted, and in a very short time the ulcer healed, the discharge and morbid secretion disappeared from the auditory canal, and as soon as that ulceration was cured the enlarged gland subsided. Here the true cause of error was remotely situated from one of the most prominent symptoms—namely, the enlarged gland in the upper part of the neck: in that respect the case is of great interest. The case stands also in a nice and close association with this group of results of nervous disturbance which prove that irritation induced in a nerve, or pressure upon a nerve, is sufficient to lead to more or less change in function and structure, and that morbid influence may after a time induce a deterioration resulting in, or sufficient to produce, a furred tongue, ulceration of skin, or grangrene of the fingers. In Dr Addison's case there was an ulceration in the auditory canal, and the gland enlarged as the consequence of the exposed lymphatics absorbing and carrying the morbid fluid of the ulcer down to the lymphatic glands. That I believe to be the true interpretation of glandular enlargements from the irritation, as it is termed, of a remote cause; the "irritation" is supposed to travel along the lymphatics to the anatomically associated glands. I believe this hypothesis of irritation is an erroneous idea, and that the true explanation is, the arrival at the gland of a morbid fluid conveyed to it by the lymphatics. I doubt the validity of the reasoning which endeavours to press upon us the conviction that mere irritation can be conveyed from a sore to a lymphatic gland; it must be that the absorbents carry a morbid fluid centripetally to the gland. Fortunately for us, these glands are highly conservative in their tendency, and they stop the progress of the morbid fluid in its onward course towards the circulation of the blood, where its damaging influence might be more diffused, and lead very frequently to the occurrence of the more serious general condition which we are in the habit of denominating pyæmia.—'Ibid

Dentistry in Turkey.—In the course of a highly-interesting paper on 'Turkey from a Medical Point of View,' in the May number of the 'N. Amer. Med.-Chir. Rev.', Dr W. Goodell gives the following spirited sketch of the state of Dentistry in that country : "Upon another occasion, the aristocratic nerves of his majesty were cruelly unstrung by the vulgar twinges of a toothache, which, imitating the example of many a rebellious pasha, traitorously entrenched itself within a molar, and refused to capitulate to the innumerable ptisans, fomentations, nostrums, spells, and incantations of the whole empirical and non-empirical faculty. Spurning the tears of the Sultanas, and the entreaties of all the favourite Odaliques of the Harem, the royal sufferer sleeplessly paced his ancestral halls for several days and nights, before he could screw up his courage to the pulling point. But, to the dismay of the chamberlain, in all Stambul not a barber or dentist, for love of money or reputation, was found so disloyal as to aspire to the *crown* of his imperial sovereign. American Dentists may smile at the pusillanimity of their Oriental brethren; but let them remember that any accident in the extraction of a royal tooth, whether fracture, delay, or any additional pain, might consign the bold operator to the bastinado, or to the tender mercies of the bowstring. At last, an obscure Jew, who had never looked higher than the jaws of his Hebrew customers, was induced to risk his heels and his neck in the dental encounter. Thrice prostrating himself, he entreated the Sultan to show his slave the offending molar. Quick as thought the forceps were applied, and immediately the Jew fell down, with a piercing shriek, at the feet of his master, in a well-assumed fit of epileptic convulsions. Up jumped the Sultan from his throne, forgetting, in his terror, his toothache, his dignity, and the pain of the extraction, and ordered his pages to bring cordials and water for the unfortunate Dentist. The wily Jew, perceiving that a hydropathic treatment was imminent, and that his buffoonery had produced the desired effect of distracting the royal attention, now convalesced with great promptness, triumphantly exhibiting the tooth to the astonished monarch and courtiers. It is hardly necessary to add, that not only was the integrity of his gluteal fascia respected, but Israel went forth from the palace, even unto his kindred, with shekels of gold and shekels of silver."

NOTICES TO READERS AND CORRESPONDENTS.

All communications intended for insertion in this Journal must be authenticated by the name and address of the writer, not necessarily for publication, but as a guarantee of good faith.

Contributors are requested to be so obliging as to write legibly, and on one side of the paper only.

All communications are requested to be addressed to Mr John W. Davies, 54 Princes street, Leicester square, the present Publisher of the Journal.

BOOKS RECEIVED IN EXCHANGE.

Dental Cosmos for November.
Dental Register of the West for October.
L'Art Dentaire for November.
German Quarterly Journal of Dental Science for October.
Pharmaceutical Journal for November.

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